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Mess Sergeant's Handbook

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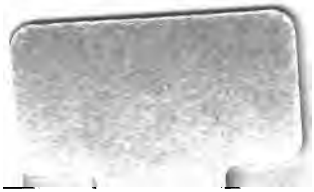

The Mess Sergeant's Handbook

Prepared by

CAPTAIN L. R. HOLBROOK
COMMISSARY U. S. ARMY

Assisted by

POST COMMISSARY SERGEANT
PATRICK DUNNE

(Fifth Thousand)

THIRD EDITION

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OTHER BOOKS

By the Same Author

The Mess Officer's Assistant

CONTENTS

CHAPTER	
I.	History of the Ration.
II.	Food Values and Elementary Principles of Nutrition.
III.	Elementary Principles of Cooking and Handling Food.
IV.	The Garrison Ration.
V.	Milk, Cheese, Lard, Compound, Etc.
VI.	Preservation of Foods. Bacteria and Mold.
VII.	Brief Extracts from Lectures by the Author.
VIII.	Definitions.

IN PREPARATION

THE ARMY BAKER—Third Edition
ARMY BEEF—Illustrated

JOURNAL OF THE U. S. CAVALRY ASS'N
FORT LEAVENWORTH, KANSAS, General Agent

PREFACE TO FIRST EDITION

ADVANCE SHEETS of this little handbook were hastily prepared in June, 1910, especially for the use of troops at the summer maneuver camps, but the increasing demand for them has induced me to complete the book for more permanent use.

It has generally been recognized that the garrison ration, as fixed in War Department orders in May, 1908, provided about the right proportions and quantities of the various classes of foods; and so long as the authorized issue suggested a basis for consumption, companies were quite certain to be provided with a well-balanced diet. Since changing the garrison ration from an issue to a cash basis, the quantities formerly issued are more than apt to be forgotten, and it is largely for this reason that I desire to place before Mess Sergeants, in a compact form, all those matters pertaining to the handling of the mess that are considered most essential to successful management.

I am indebted to First Lieutenant Sherrard Coleman, Eighth Cavalry, for preparing Bills of Fare for the Field, etc., and to Post Commissary Sergeant Patrick Dunne for general assistance in checking the accuracy of quantities throughout the text.

L. R. HOLBROOK,
Captain, Commissary, U. S. Army.
Director of Training School for Bakers and Cooks, Fort Riley, Kansas.

November 1, 1910.

PREFACE TO SECOND EDITION

The first edition of one thousand copies having become exhausted in the brief period of six months, and numerous changes in Army Regulations having occurred, a revision of the text and complete re-setting of the type has been rendered necessary.

It is suggested that the Mess Officer's Assistant be studied in connection with the Mess Sergeant's Handbook by those desiring more intimate knowledge of foods in general and of the essential principles of handling each article of the ration as taught at the Training School for Bakers and Cooks at Fort Riley, Kansas.

L. R. HOLBROOK,
Captain, Commissary, U. S. Army.

June 1st, 1911.

PREFACE TO THIRD EDITION

Upon inquiry it is found that this book still meets the requirements at the Training School for Bakers and Cooks, Fort Riley, Kansas, and only such changes have been made as were required by new Army Regulations.

L. R. HOLBROOK,
Captain, 4th Cav.

March 1, 1916.

TABLE OF CONTENTS

CHAPTER		PARAGRAPHS
I.	Explanation of the Regulations Pertaining to the Ration	1-3
II.	Determination of the Cash Value of the Garrison and Travel Rations	4-7
III.	Short-cut Ration Conversion Tables	8
IV.	Relation of Daily Credit Allowance to Bills of Fare	9-13
V.	Quantities of the Several Components to Prepare for Each Meal	14-16
VI.	Bills of Fare for Garrison	17-21
VII.	Fresh Beef; Specifications, Sex, Age	
VII.	Fresh Beef. Specieications, Sex, Age and Quality	22-25
VIII.	Fireless Cookers	26
IX.	Handling the Ration in the Field	27
X.	Field Expedients	28-30
XI.	Individual Cooking	31-39
XII.	Instructions for Installing and Operating Army Field Ranges Nos. 1 and 2 and Battalion Incinerator	40-44
XIII.	Short-cut Multiplication Table	45

The Mess Sergeant's Handbook

CHAPTER I.

EXPLANATION OF THE REGULATIONS PERTAINING TO THE RATION

1. **Introductory.** On July 1st, 1910, the garrison, travel and Filipino rations passed from an issue to a cash basis, thus placing the responsibility for providing a *well-balanced diet* (See Mess Officer's Assistant, paragraph 21) upon the organization commander, and indirectly upon the Mess Sergeant. Now, more than ever before, the messing of troops requires an accurate knowledge of the regulations pertaining to the ration, reliable information as to what variety and quantity of food men under normal conditions of service require, and simple methods of handling all accounts pertaining to the same.

It is the policy of the Quartermasters Department to supply a ration at all times appropriate to the service being performed, and its best ration—The Garrison Ration—is authorized so long as facilities for handling it are provided; and it is contemplated that when the Reserve Ration is used, other articles shall be provided to supplement it whenever practicable. The Reserve Ration, thus augmented, is called the Field Ration.

The Field Ration, established in 1901, was abolished by general orders No. 15, War department, January 25, 1911. It was reëstablished as a modified reserve ration by C. A. R. 8, 1914 and troops now pass directly from the elaborate garrison cash ration to the simple or modified reserve ration on a strictly *issue* basis, without savings, while the emergency ration is provided as a gratuitous issue. For a history of the ration, see chapter I, Mess Officer's Assistant.

2. **Regulations and Orders.** A ration is the allowance for the subsistence of one person for one day. The garrison ration is intended for troops in garrison and, in time of peace, for troops in maneuver camps; the ration to be issued to troops on the march in time of peace will be prescribed by the commander, and will not exceed the allowances prescribed for the garrison ration; the travel ration is for troops traveling otherwise than by marching and separated from cooking facilities; the reserve ration is carried on the person of the men and in the trains, and constitutes the reserve for field service; the field ration is the ration prescribed in orders by the commander of the field forces; the Filipino ration is for use of the Philippine Scouts; and the emergency ration for troops in active campaign for use on occasions of emergency or in the field for purposes of instruction.

In time of war when Philippine Scouts are serving in the field, they will be subsisted the same as are regular troops. When impracticable for Philippine Scouts to use the Filipino ration while traveling otherwise than by marching, on account of the lack of cooking facilities

or for other reasons, the travel ration may be prescribed.

The commanding officer will determine which of the several prescribed rations is appropriate for the particular service to be performed and will direct the use of the same.

A full day's ration is the unit. Fractional parts of the unit for a fractional part of a day are not allowed. Enlisted men joining station at or before the dinner hour of a given day will be allowed full rations for the day. A fraction of a ration less than one-half is disregarded, and a fraction more than one-half is considered a ration.

3. All articles of the *garrison, travel or Filipino ration* due a company or other military organization, will be retained by the commissary and credit given to the organization for the money value of these articles at the current prices, and the commissary will pay as savings to the organization commanders any excess in value of the stores so retained over those purchased by the organization.

The commanding officer will designate the periods for which ration returns are to be submitted. Immediately upon the receipt of a ration return at the commissary, duly signed and approved, the commissary will enter it, together with the actual cost of the ration as computed on the back of the Ration and Savings Account. The stores required will be purchased from the commissary on Charge Sales Slips, in the name of the organization, and charged against their credit account. At the end of the month, or whenever necessary, the organization commander will settle the account at the commissary, when the savings due the organization, or the amount due the commissary, as the case may be, will be paid and the account certified as required. On account of the varying cost of the ration in different localities, the ration and savings accounts should be settled, upon departure from a post, to include the last day for which rations are taken. Upon arrival at the new station a new account is opened, and credit given at the prevailing price at the new station, thus avoiding any pecuniary loss through having to purchase articles of the ration at prices higher than those upon which the credit allowance was computed.

A ration return for a company will include all the men belonging to it present at the post; that for the detachment of the post non-commissioned staff will include all the members present for duty; that for the detachment of civilian employes, Quartermaster's Department, will include all the civilians employed by that department and entitled to rations and present for duty; and similarly for other detachments of enlisted men and of civilians.

If it is impracticable for a man messing separately to subsist himself until the end of the month, when settlements are usually made, the company or detachment commander may give the man a written order on the commissary for an amount of stores not to exceed the value of his ration. The value of the supplies so furnished will be charged to the company or detachment commander in the sales ledger and adjusted when settlement is made with the company or detachment commander. These written orders will be filed with the records of the commissary.

Money accruing from the Ration and Savings Account of an organization will be spent only for food.

All articles of the ration required for the supply of troops will be obtained from the commissary when on hand, except that if an organization uses during the month more of any article of the ration than is authorized by regulations, such excess need not necessarily be bought from the commissary, or if any article be not in stock, a temporary supply may be purchased elsewhere.

CHAPTER II.

DETERMINATION OF THE CASH VALUE OF THE GARRISON AND TRAVEL RATIONS.

RATION TABLES.

4. The Cash Value of the Garrison and Travel Rations is determined by taking the percentages of the several components and substitutive articles (Paragraph 6) as indicated below:

GARRISON RATION.

Articles	Unit	Per cent.	Quantity per 100 rations	Cents per Unit	Value of 100 rations Dol.	cts.
Beef, fresh	Pound	70	87.5			
Bacon, issue	Pound	30	22.5			
Flour, issue	Pound	100	112.5			
Baking powder	No. ½ can	100	1.			
Beans	Pound	50	7.5			
Rice	Pound	50	5.			
Potatoes, fresh	Pound	70	87.5			
Onions, fresh	Pound	20	25.			
Tomatoes, canned	Small can	10	6.25			
or						
Tomatoes, canned	No. 10 can	10	1.923			
Prunes	Pound	30	2.4			
Jam	No. 2 can	50	2.539			
Apples, evaporated	Pound	10	.8			
Peaches, evaporated	Pound	10	.8			
Coffee, R. & G.	Pound	100	7.			
Sugar	Pound	100	20.			
Milk, evaporated	12-oz. can	100	4.166			
or						
Milk, evaporated	16-oz. can	100	3.125			
or						
Milk, evaporated	32-oz. can	100	1.5625			
Vinegar	Gallon	50	.25			
Pickles, cucumber	Gallon	50	.25			
Salt	Pound	100	4.			
Pepper, black	No. ¼ can	100	1.			
Cinnamon	No. ¼ can	100	.35			
Lard, issue	Pound	100	4.			
or						
Lard, issue	No. 5 pail	100	.9615			
Butter	Pound	100	3.125			
Sirup	Gallon	100	1.			
Flav. Ext., Lemon	2-oz. bot.	100	.7			
or						
Flav. Ext., Lemon	8-oz. bot.	100	.175			
Cash value of 100 rations						
Cash value of one ration						

Note: In computing the cost of the ration for November and December, when the turkey available for supply costs more than the regular meat ration the proper allowance will be made by adding to the amount due the organization for that period the product of the number of men present on the holiday multiplied by the excess cost of the turkey over the regular meat ration. When turkey is undrawn, the allowance is 19 ounces per ration.

When a component or substitutive article of the ration is on hand in different kinds of packages, the price of the article varying with the package, the lowest price of the article on hand per gill, gallon, ounce, or pound, as the case may be, will be used in computing the cost of the ration, except when the use of a particular article is ordered by the commanding officer.

TRAVEL RATION

Articles	Unit	Per cent.	Quantity per 100 rations	Cents per Unit	Value of 100 rations Dol.	Value of 100 rations cts.
*Soft bread	Pound	100	112.5			
or						
*Hard bread	Pound	100	100.			
*Beef, corned	2-lb. can	100	37.5			
or						
*Beef, corned	No. 2 can	100	50.			
or						
*Hash, corned beef	2-lb. can	100	37.5			
or						
*Hash, corned beef	No. 2 can	100	50.			
*Beans, baked	No. 1 can	100	40.			
or						
*Beans, baked	No. 3 can	100	12.5			
*Tomatoes	Small can	100	25.			
or						
*Tomatoes	No. 10 can	100	7.692			
Jam	No. 2 can	100	5.555			
†Coffee, R. & G.	Pound	100	7.			
†Sugar	Pound	100	15.			
†Milk, evaporated	Family can	100	4.166			
or						
†Milk, evaporated	Hotel can	100	1.5625			
Cash value of 100 rations						
Cash value of one ration						

*The cash credit will be based on the particular article intended to be used by the troops. (Decision Office Commissary General, May 18, 1910—231279.)

†When 21 cents coffee money is paid, the coffee, sugar and milk components will not be included when computing the travel ration.

MISCELLANEOUS NOTES

Reserve Ration. One day in each alternate month of the season of practical instruction, not exceeding three days in each year, the use of the reserve ration with individual cooking will be required by all troops in the field for purposes of instruction.

Field Ration. The field ration is the ration prescribed in orders by the commander of the field forces. It consists of the reserve ration in whole or in part, supplemented by articles of food requisitioned or purchased locally, or shipped from the rear, provided such supplements or substitutes correspond generally with the component articles or substitutive equivalents of the garrison ration.

Emergency Ration. The emergency ration is furnished, in addition to the regular ration, as required for troops on active campaign or in the field for purposes of instruction, and will not be opened except by order of an officer or in extremity, nor used when regular rations are obtainable.

Ration returns upon which emergency rations are drawn will bear the certificate of the organization commander that such rations are required for the enlisted men of his organization, and that the money value of any rations previously drawn by him, and improperly opened or lost, has been charged against the person responsible.

Company and detachment commanders are responsible for the proper care and use of emergency rations carried on the person of the soldier.

THE ARMY RATION

6. Table showing the amounts of the component articles of the Garrison, Reserve, Travel and Filipino Rations and of their substitutive equivalents.

AMOUNTS OF THE COMPONENT ARTICLES PRINTED IN HEAVY TYPE.

100 Garrison Rations	Articles		Reserve ration.	Travel ration.	Filipino ration.
125 lbs.	Beef, fresh ..... oz..	20	.....	.....	12
125 lbs.	Mutton, fresh ..... oz..	20	.....	.....	.....
75 lbs.	Bacon ..... oz..	*a*12	12	.....	8
	Beef, corned, canned ..... oz..		16	12	8
100 lbs.	Canned meat ..... oz..	*b*16		.....	8
100 lbs.	Hash, corned beef ..... oz..	*b*16	*h*16	12	.....
87½ lbs.	Fish, dried ..... oz..	14	.....	.....	.....
112½ lbs.	Fish, pickled ..... oz..	18	.....	.....	.....
100 lbs.	Fish, canned ..... oz..	16	.....	.....	12
	Fish, fresh ..... oz..	.....	.....	.....	12
100 lbs.	Turkey, dressed, drawn ..... oz..	*c*16	.....	.....	.....
112½ lbs.	Flour ..... oz..	18	.....	.....	8
112½ lbs.	Soft bread ..... oz..	18	.....	18	8
100 lbs.	Hard bread ..... oz..	*d*16	16	16	8
125 lbs.	Corn meal ..... oz..	20	.....	.....	.....
½ lb.	Baking powder ..... oz..	.08	.....	.....	*e*.32
15 lbs.	Beans ..... oz..	2.4	.....	.....	.....
	Beans, baked ..... oz..	.....	.....	4	.....
10 lbs.	Rice ..... oz..	1.6	.....	.....	.....
	Rice, unpolished ..... oz..	.....	.....	.....	20
10 lbs.	Hominy ..... oz..	1.6	.....	.....	.....
125 lbs.	Potatoes, fresh ..... oz..	*f*20	.....	.....	8
93¾ lbs.	Potatoes, canned ..... oz..	*g*15	.....	.....	.....
125 lbs.	Onions, fresh ..... oz..	*f,i*20	.....	.....	8
125 lbs.	Tomatoes, canned ..... oz..	*f*20	.....	8	.....
125 lbs.	Other fresh vegetables (not canned) ..... oz..	*f,i*20			
8 lbs.	Prunes ..... oz..	1.28	.....	.....	.....

8 lbs.	Apples, evaporated ..... oz..	1.28	.....	.....	.....
8 lbs.	Peaches, evaporated ..... oz..	1.28	.....	.....	.....
8 lbs.	Jam ..... oz..	*j*1.28	.....	1.4	.....
7 lbs.	Coffee, roasted and ground ..... oz..	1.12	1.12	1.12	1
7 lbs.	Coffee, roasted ..... oz..	1.12	.....	.....	.....
8¾ lbs.	Coffee, green ..... oz..	1.4	.....	.....	.....
2 lbs.	Tea, black or green ..... oz..	.32	.....	.....	.....
20 lbs.	Sugar ..... oz..	3.2	2.4	2.4	3
3⅛ lbs.	Milk, evaporated, unsweetened ... oz..	.5	.....	.5	.....
½ gal	Vinegar ..... gill..	.16	.....	.....	.08
½ gal	Pickles, cucumber ..... gill..	*j*.16	.....	.....	.....
4 lbs.	Salt ..... oz..	.64	.16	.....	.64
¼ lb.	Pepper ..... oz..	.04	.....	.....	.02
1.4 oz.	Cinnamon ..... oz..	.014	.....	.....	.....
1.4 oz.	Cloves ..... oz..	.014	.....	.....	.....
1.4 oz.	Ginger ..... oz..	.014	.....	.....	.....
1.4 oz.	Nutmeg ..... oz..	.014	.....	.....	.....
4 lbs.	Lard ..... oz..	.64	.....	.....	.....
4 lbs.	Lard substitute ..... oz..	.64			
3⅛ lbs.	Butter ..... oz..	.5	.....	.....	.....
3⅛ lbs.	Oleomargarine ..... oz..	.5	.....	.....	.....
1 gal.	Sirup ..... gill..	.32	.....	.....	.....
1.4 oz.	Flavoring extract:				
	Lemon ..... oz..	.014	.....	.....	.....
	Vanilla ..... oz..	.014	.....	.....	.....

a In Alaska 16 ounces, or 16 ounces salt pork or 22 ounces salt beef.
b When impracticable to furnish fresh meat.
c On Thanksgiving Day and Christmas, when practicable.
d To be ordered issued only when the interests of the Government so require.
e When in the field and ovens are not available.
f In Alaska 24 ounces.
g in Alaska 18 ounces.
h Or other canned meats 16 ounces.
i Not exceeding 20% of total issue.
j Not exceeding 50% of total issue.

TOTAL CASH VALUE OF RATIONS CREDITED—TABLE EXPLAINED

7. **The Value of a Single Ration** is determined by the Commissary; it is based upon the current prices of the various component and substitute articles of the ration, and varies but little from month to month. See paragraph 4. **The total cash value of the ration return** submitted may be quickly and sufficiently accurately determined by the Mess Sergeant by consulting the following table. For example, assume that the cash value of the ration is $ .2105; that the number of rations credited is 823. Follow along the top line for the figures nearest to the value of the ration—in this case $ .21; then follow down the left hand margin, and add together the corresponding value of:

3 rations,.....	$ .63
20 rations,.....	$ 4.20
and 800 rations,.....	$168.00
	$172.83

which amount is slightly less than the actual allowance, but sufficiently accurate for the Mess Sergeant to base his calculations upon until the actual figures are given him by the Commissary.

TABLE FOR DETERMINING THE MONEY VALUE OF THE CASH RATION.

No. of Rations.	Cost of Ration.														
1	$ .18	$ .185	$ .19	$ .195	$ .20	$ .205	$ .21	$ .215	$ .22	$ .225	$ .23	$ .235	$ .24	$ .245	$ .25
2	.36	.37	.38	.39	.40	.41	.42	.43	.44	.45	.46	.47	.48	.49	.50
3	.54	.555	.57	.585	.60	.615	.63	.645	.66	.675	.69	.705	.72	.735	.75
4	.72	.74	.76	.78	.80	.82	.84	.86	.88	.90	.92	.94	.96	.98	1.00
5	.90	.925	.95	.975	1.00	1.025	1.05	1.075	1.10	1.125	1.15	1.175	1.20	1.225	1.25
6	1.08	1.11	1.14	1.17	1.20	1.23	1.26	1.29	1.32	1.35	1.38	1.41	1.44	1.47	1.50
7	1.26	1.295	1.33	1.365	1.40	1.435	1.47	1.505	1.54	1.575	1.61	1.645	1.68	1.715	1.75
8	1.44	1.48	1.52	1.56	1.60	1.64	1.68	1.72	1.76	1.80	1.84	1.88	1.92	1.96	2.00
9	1.62	1.665	1.71	1.755	1.80	1.845	1.89	1.935	1.98	2.025	2.07	2.115	2.16	2.205	2.25
10	1.80	1.85	1.90	1.95	2.00	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50
20	3.60	3.70	3.80	3.90	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	5.00
30	5.40	5.55	5.70	5.85	6.00	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	7.50
40	7.20	7.40	7.60	7.80	8.00	8.20	8.40	8.60	8.80	9.00	9.20	9.40	9.60	9.80	10.00
50	9.00	9.25	9.50	9.75	10.00	10.25	10.50	10.75	11.00	11.25	11.50	11.75	12.00	12.25	12.50
60	10.80	11.10	11.40	11.70	12.00	12.30	12.60	12.90	13.20	13.50	13.80	14.10	14.40	14.70	15.00
70	12.60	12.95	13.30	13.65	14.00	14.35	14.70	1505	15.40	15.75	16.10	16.45	16.80	17.15	17.50
80	14.40	14.80	15.20	15.60	16.00	16.40	16.80	17.20	17.60	18.00	18.40	18.80	19.20	19.60	20.00
90	16.20	16.65	17.10	17.55	18.00	18.45	18.90	19.35	19.80	20.25	20.70	21.15	21.60	22.05	22.50
100	18.00	18.50	19.00	19.50	20.00	20.50	21.00	21.50	22.00	22.50	23.00	23.50	24.00	24.50	25.00
200	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00
300	54.00	55.50	57.00	58.50	60.00	61.50	63.00	64.50	66.00	67.50	69.00	70.50	72.00	73.50	75.00
400	72.00	74.00	76.00	78.00	80.00	82.00	84.00	86.00	88.00	90.00	92.00	94.00	96.00	98.00	100.00
500	90.00	92.50	95.00	97.50	100.00	102.50	105.00	107.50	110.00	112.50	115.00	117.50	120.00	122.50	125.00
600	108.00	111.00	114.00	117.00	120.00	123.00	126.00	129.00	132.00	135.00	138.00	141.00	144.00	147.00	150.00
700	126.00	129.50	133.00	136.50	140.00	143.50	147.00	150.50	154.00	157.50	161.00	164.50	168.00	171.50	175.00
800	144.00	148.00	152.00	156.00	160.00	164.00	168.00	172.00	176.00	180.00	184.00	188.00	192.00	196.00	200.00
900	162.00	166.50	171.00	175.50	180.00	184.50	189.00	193.50	198.00	202.50	207.00	211.50	216.00	220.50	225.00
1000	180.00	185.00	190.00	195.00	200.00	205.00	210.00	215.00	220.00	225.00	230.00	235.00	240.00	245.00	250.00

CHAPTER III

SHORT-CUT RATION CONVERSION TABLES

8. **Approximate Amount of Each Component of the Ration to be Supplied.** The following table should be consulted in determining the quantities of the several components of the ration that would have been supplied if they had actually been issued instead of the cash value being credited at the Commissary. The quantities are based upon ordinary requirements and the amount of any particular article purchased should seldom exceed the amount given in the table unless a corresponding saving is made on other components. For example, an additional supply of sugar, lard, butter and milk is frequently desired, in which case a corresponding reduction should be made in the amount of such articles as beef, flour (or bread), fresh vegetables, fruit, coffee, and seasoning components; or if, for variety, certain meats, fruits and vegetables are desired and are not sold by the Commissary, a reduction should be made on the corresponding components sufficient in amount to cover the purchases desired. For a study of the nutritive values of food, see Chapter II, Mess Officers' Assistant.

If no supplies are on hand, and previous experience does not determine just how the credit allowance should be spent, it is suggested that, under ordinary conditions in garrison, about the following amounts be drawn for a ten day period:

Beef,	5 to 6 days	The remainder of the credit allowance for this component to be used for the purchase of liver, hearts, fish, pork, etc. See Pars. 72-82, Mess Officer's Assistant.
Bacon,	1 to 2 days	

Bread, Flour,	5 to 6 days 2 to 3 days	The saving to be used for general purchases such as oatmeal, cornmeal, prepared breakfast foods, etc. See Pars. 83-96, Mess Officer's Assistant.
Potatoes, Onions, Tomatoes,	6 days 1 day 1 day	The savings to be used for the purchase of other vegetables—cabbage, turnips, sweet potatoes, etc. See Pars. 101-115, Mess Officer's Assistant.
Coffee, Tea.	8 to 9 days 1 to 2 days	The savings to be used for general purchases. See Pars. 121-129, Mess Officer's Assistant.
Beans, Rice, Hominy,	6 days 2 days 2 days	See Pars. 97-100, Mess Officer's Assistant.
Dried Fruit,		Purchases made according to circumstances. Unless fresh fruit is reasonable, the entire allowance should generally be consumed, taking one-fourth of the allowance in jam and dividing the remainder equally among the other items allowed. Vary in subsequent periods. See Pars. 116-120, Mess Officer's Assistant.
All other components,		Draw the full allowance as shown in table. See Pars. 130-157, Mess Officer's Assistant.

In all subsequent drawings, the stock in the storeroom should be taken into consideration, so that the total on hand after the purchases are made will not exceed the requirements. For a study of the general subject of the preservation of foods, see Chapter VI, Mess Officer's Assistant. Organizations differ quite materially as to the proportions of the several articles used, but this difference has been found to depend more upon the personal characteristics and efficiency of the cooks than upon the tastes of the men composing the mess.

No. of rations	Beef, fresh Mutton, fresh	Bacon	Beef, fresh r'st. Beef, corned Hash corned beef Fish, canned Turkey drawn	Turkey Undrawn	Fish, dried	Fish, pickled	Flour Soft bread
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
1	1.25	.75	1	1.18	.87	1.12	1.12
2	2.50	1.5	2	2.37	1.75	2.25	2.25
3	3.75	2.25	3	3.56	2.62	3.37	3.37
4	5	3	4	4.75	3.5	4.5	4.5
5	6.25	3.75	5	5.93	4.37	5.62	5.62
6	7:50	4.50	6	7.12	5.25	6.75	6.75
7	8.75	5.25	7	8.31	6.12	7.87	7.87
8	10	6	8	9.5	7	9	9
9	11.25	6.75	9	10.68	7.87	10.12	10.12
10	12.5	7.50	10	11.87	8.75	11.25	11.25
20	25	15	20	23.75	17.5	22.5	22.5
30	37.5	22.5	30	35.62	26.25	33.75	33.75
40	50	30	40	47.50	35	45	45
50	62.5	37.5	50	59.37	43.75	56.25	56.25
60	75	45	60	71.25	52.5	67.5	67.5
70	87.5	52.5	70	83.12	61.25	78.75	78.75
80	100	60	80	95	70	90	90
90	112.5	67.5	90	106.87	78.75	101.25	101.25
100	125	75	100	118.75	87.5	112.5	112.5
200	250	150	200	237.5	175	225	225
300	375	225	300	305.62	262.5	337.5	337.5
400	500	300	400	475	350	450	450
500	625	375	500	593.75	437.5	562.5	562.5
600	750	450	600	712.5	525	675	675
700	875	525	700	831.25	612.5	787.5	787.5
800	1000	600	800	950	700	900	900
900	1125	675	900	1187.5	787.5	1012.5	1012.5
1000	1250	750	1000	1187.5	875	1125	1125

GARRISON RATION

No. of rations	Hard bread	Corn meal	Baking Powder	Beans	Rice Hominy	Potatoes fresh Onions, fresh Other fresh vegetables	Potatoes canned	Tomatoes canned
	lb.	lb.	can	lb.	lb.	lb.	30-oz. can	s.can
1	1	1.25	.01	.15	.1	1.25	.5	.62
2	2	2.5	.02	.30	.2	2.5	1	1.25
3	3	3.75	.03	.45	.3	3.75	1.5	1.87
4	4	5	.04	.6	.4	5	2	2.5
5	5	6.25	.05	.75	.5	6.25	2.5	3.12
6	6	7.50	.06	.9	.6	7.50	3	3.75
7	7	8.75	.07	1.05	.7	8.75	3.5	4.37
8	8	10	.08	1.20	.8	10	4	5
9	9	11.25	.09	1.35	.9	11.25	4.5	5.62
10	10	12.50	.1	1.50	1.	12.5	5	6.25
20	20	25	.2	3	2	25	10	12.5
30	30	37.5	.3	4.5	3	37.5	15	18.75
40	40	50	.4	6	4	50	20	25
50	50	62.5	.5	7.5	5	62.5	25	31.25
60	60	75	.6	9	6	75	30	37.5
70	70	87.5	.7	10.5	7	87.5	35	43.75
80	80	100	.8	12	8	100	40	50
90	90	112.5	.9	13.5	9	112.5	45	56.25
100	100	125	1	15	10	125	50	62.5
200	200	250	2	30	20	250	100	125
300	300	375	3	45	30	375	150	187.5
400	400	500	4	60	40	500	200	250
500	500	625	5	75	50	625	250	312.5
600	600	750	6	90	60	750	300	375
700	700	874	7	105	70	875	350	437.5
800	800	1000	8	120	80	1000	400	500
900	900	1125	9	135	90	1125	450	562.5
1000	1000	1250	10	150	100	1250	500	625

SHORT CUT CONVERSION TABLES

No. of rations	Prunes Apples, evap. Peaches, evap. lb.	Jam blackberry can	Coffee, roasted Coffee, R. & G. lb.	Coffee, green lb.	Tea lb.	Sugar lb.	Milk, evap. 1-lb. can	Vinegar Pickles, cucumber gal.
1	.08	.05	.07	.087	.02	.2	.03	.005
2	.16	.10	.14	.175	.04	.4	.06	.01
3	.24	.15	.21	.262	.06	.6	.09	.015
4	.32	.2	.28	.350	.08	.8	.12	.02
5	.4	.25	.35	.437	.1	1	.16	.025
6	.48	.3	.42	.525	.12	1.2	.19	.03
7	.56	.36	.49	.612	.14	1.4	.22	.035
8	.64	.41	.56	.7	.16	1.6	.25	.04
9	.72	.46	.63	.787	.18	1.8	.28	.045
10	.8	.51	.7	.875	.2	2	.31	.05
20	1.6	1.02	1.4	1.75	.4	4	.62	.1
30	2.4	1.52	2.1	2.625	.6	6	.94	.15
40	3.2	2.03	2.8	3.5	.8	8	1.25	.2
50	4	2.54	3.5	4.375	1	10	1.56	.25
60	4.8	3.05	4.2	5.25	1.2	12	1.87	.3
70	5.6	3.56	4.9	6.125	1.4	14	2.19	.35
80	6.4	4.06	5.6	7	1.6	16	2.5	.4
90	7.2	4.57	6.3	7.875	1.8	18	2.81	.45
100	8	5.08	7	8.75	2	18	3.12	.5
200	16	10.16	14	17.5	4	40	6.25	1
300	24	15.24	21	26.25	6	60	9.37	1.5
400	32	20.32	28	35.0	8	80	12.5	2
500	40	25.4	35	43.75	10	100	15.62	2.5
600	48	30.47	42	52.5	12	120	18.75	3
700	56	35.56	49	61.25	14	140	21.87	3.5
800	64	40.63	56	70	16	160	25	4
900	72	45.71	63	78.75	18	180	28.12	4.5
1000	80	50.79	70	87.5	20	200	31.25	5

GARRISON RATION

No. of rations	Salt	Pepper	Cinnamon Cloves Ginger	Nutmegs	Lard	Butter Oleomargarine	Sirup	Flavoring Extract
	lb.	No. ¼ can	No. ¼ can	oz.	lb.	lb	gal.	2-oz. bot
1	.04	.01	.003	.01	.04	.03	.01	.007
2	.08	.02	.007	.02	.08	.06	.02	.014
3	.12	.03	.010	.04	.12	.09	.03	.021
4	.16	.04	.014	.05	.16	.12	.04	.028
5	.20	.05	.017	.07	.20	.16	.05	.035
6	.24	.06	.021	.08	.24	.19	.06	.042
7	.28	.07	.024	.09	.28	.22	.07	.049
8	.32	.08	.028	.11	.32	.25	.08	.05
9	.36	.09	.031	.12	.36	.28	.09	.06
10	.40	.1	.035	.14	.4	.31	.1	.07
20	.80	.2	.07	.28	.8	.62	.2	.14
30	1.2	.3	.10	.42	1.2	.94	.3	.21
40	1.6	.4	.14	.56	1.6	1.25	.4	.28
50	2	.5	.17	.70	2	1.56	.5	.35
60	2.4	.6	.21	.84	2.4	1.87	.6	.42
70	2.8	.7	.24	.98	2.8	2.19	.7	.49
80	3.2	.8	.28	1.1	3.2	2.50	.8	.56
90	3.6	.9	.31	1.2	3.6	2.81	.9	.63
100	4	1	.35	1.4	4	3.12	1	.7
200	8	2	.7	2.8	8	6.25	2	1.4
300	12	3	1.05	4.2	12	9.37	3	2.1
400	16	4	1.4	5.6	16	12.50	4	2.8
500	20	5	1.75	7.03	20	15.62	5	3.5
600	24	6	2.1	8.4	24	18.75	6	4.2
700	28	7	2.45	9.8	28	21.87	7	4.9
800	32	8	2.8	11.2	32	25	8	5.6
900	36	9	3.15	12.6	36	28.12	9	6.3
1000.	40	10	3.5	14	40	31.25	10	7

CHAPTER IV

RELATION OF DAILY CREDIT ALLOWANCE TO BILLS OF FARE

9. **How to Keep Within the Limits of the Credit Allowance of the Garrison Ration from Day to Day.** Having determined the total cash value of the rations credited at the Commissary for a given period, par. 7, it is important to note just what the daily cash credit is, so that the cost of the food consumed each day shall not, when averaged, exceed that amount (increased by any additional allowance from the fund).

The cash credit for a ten day period having been determined the daily allowance may be found by moving the decimal point one place to the left. Taking the example cited in paragraph 7, where the total cash credit for the ten day period is $172.83, the daily credit is found to be $17.28.

When the rations are drawn for any other period than ten days, or when the number of men in the mess is quite variable, the daily cash credit should be taken directly from the table in paragraph 7; thus the credit allowance for 80 men for one day, or 80 rations at say 21c per ration, is seen to be $16.80, or for 86 men, $18.06, etc.

10. *The cash credit for the day having been found,* it now becomes necessary to prepare such bills of fare that the credit allowance shall not be exceeded; or, when exceeded, the Mess Sergeant should be able to see where a corresponding reduction can be made on one or more succeeding days to cover the excess credit

consumed. Thus, for example, if ham butts, fish or chicken is supplied and costs more than beef, such cheaper substitutes as liver, beef-hearts, sausage, etc., should be supplied at other times to equalize the cost and provide variety. The same may be said of such breakfast foods as corn flakes and other cereals sold in small packages, being varied and balanced by oatmeal, cornmeal, hominy and graham flour, which are cheaper.

11. *The general scheme* of figuring out the cost of each meal should be followed and in doing this seasonings need not be considered, as their cost is generally small, and the result desired is but approximate .

The method given may at first appear irksome and unnecessary, but one soon acquires remarkable facility in figuring the cost of living from day to day, and it is the only satisfactory and positive method of proving to one's satisfaction that the organization is or is not living on the allowance. Where prices remain quite constant and the number of men in the mess changes but little, mess sergeants at the training school have become so expert in figuring out the cost of meals as to determine the daily running expenses of the mess in a few minutes. Familiarity with quantities consumed and current prices renders the work very simple.

To illustrate the method two ordinary bills of fare for 50 men in garrison have been figured out and follow on the next page. The quantities used are based upon data found later in the next (pages 32-34), and the prices are those now current at Fort Riley.

12. SAMPLE OF BILL OF FARE WITH COST FIGURED—MONDAY.

For 50 men. Value of ration, 23 cents.

Breakfast	Ingredients	Cost
Fried Cornmeal Mush and Sirup	5 lbs. cornmeal; 1½ gal. sirup,	$ .76
Beef Fritters and Sauce,	8 lbs. beef, 8 lbs. potatoes, 2 cans tomatoes,	.96
Boiled Potatoes,	12½ lbs. potatoes,	.17
Bread,	14 lbs. bread,	.32
Coffee,	30 oz. coffee, 1½ lbs. sugar,	.42
Dinner	**Total cost -**	**$ 2.63**
Bean Soup,	5 lbs. beans, 1 lb. bacon, stock,	.38
Baked Halibut,	25 lbs. fish (Halibut),	3.75
Creamed Potatoes,	20 lbs. potatoes, 1 can evap. milk, 1 lb. flour,	.33
Stewed Onions,	12½ lbs. onions, 1 lb. flour,	.19
Cottage Pudding,	5 lbs. flour, 2½ lbs. sugar, 1½ lbs. lard, 10 eggs, salt, ext.	.57
Bread and Coffee with Milk,	24 oz. coffee, 1¼ lbs. sugar, 1 16-oz. can milk, 14 lbs. bread,	.74
Supper	**Total cost -**	**$ 5.96**
Hamburg Steak and Gravy,	11 lbs. beef, 4 lbs. onions,	1.12
Fried Potatoes,	16 lbs. potatoes, ½ lb. lard,	.26
Fried Onions,	9½ onions,	.28
Tea Buns and Butter,	14 lbs. flour, ¾ lb. sugar, ½ lb. lard, salt,	.42
Tea,	3 oz. tea, 1½ lbs. sugar,	.17
	Total cost	**$ 2.25**
	Total cost of the 3 meals	**10.84**
	Credit allowance for 50 men at 23c	**11.50**
	Unexpended balance	**.66**

13. SAMPLE OF BILL OF FARE WITH COST FIGURED—TUESDAY.

Breakfast	Ingredients	Cost
Fried Eggs and Bacon,	12½ dozen eggs, 6 lbs. bacon	$ 3.46
Fried Potatoes,	12½ lbs. potatoes; ½ lb. lard,	.22
Bread,	14 lbs. bread,	.32
Coffee,	30 oz. coffee, 1¼ lbs. sugar,	.41
Dinner	Total cost, -	$ 4.41
Rice and Tomato Soup,	1½ lbs. rice, 2 lbs. tomatoes	.13
Pot Roast and Gravy,	20 lbs. beef, with bone extracted,	2.15
Mashed Potatoes,	20 lbs. potatoes, ½ lb. lard,	.31
Stewed Beans,	4¾ lbs. beans, 1 lb. bacon,	.35
Bread and Butter,	14 lbs. bread, 1½ lbs. butter,	.70
Brown Betty and Sauce,	5 lbs. scrap bread, 2½ lbs. sugar, 1 lb. lard, 1 lb. flour, 2 lbs. evaporated apples,	.60
Coffee and Milk,	24 oz. coffee, 1 12-oz. can milk, 1¼ lbs. sugar,	.40
Supper	Total cost, -	$ 4.64
Beef Liver and Bacon,	11 lbs. liver, 6 lbs. bacon,	1.74
Lyonnaise Potatoes,	16 lbs. potatoes, 5 lbs. onions,	.35
Bean Salad,	1 gal. cooked beans, 1 pt. vinegar, 1 pt. pickles, 1 can tomatoes, 1 lb. onions,	.27
Pocketbook Rolls,	14 lbs. flour, ¾ lb. sugar, ½ lb. lard, salt,	.42
Tea,	3 oz. tea, 1¼ lbs. sugar,	.16
	Total cost	$ 2.94
	Total cost of three meals	11.99
	Credit allowance for 50 men	11.50
	Excess cost for the day	.49
	Balance from Monday	.66
	Unexpended balance	.17

CHAPTER V

QUANTITIES OF THE SEVERAL COMPONENTS TO PREPARE FOR EACH MEAL

14. Nothing is of greater importance than that a well-balanced diet be prepared—that is, that a suitable *variety* of food appear on the bills of fare, and the various components be served in *appropriate quantities*. Otherwise, there will be unnecessary waste of materials, and an overloading of the system with food that is not required, and that will consequently not be assimilated.

Where experience with any particular organization does not indicate what amounts of the various components of a meal will be required, the following data may be of assistance. The quantities given are based upon long experience with many company messes at the Training School for Bakers and Cooks, Fort Riley, Kansas, where they have been found to be sufficient; but, when preparing the quantities suggested, it should be remembered that the bills of fare have in general, been about as follows, and that if a fewer number of courses are served, the several articles must be correspondingly increased. See chapter IV, Mess Officers Assistant (The Garrison Ration).

BREAKFAST—Fruit or a Breakfast Food,
Meat in some form with a Vegetable,
Hot Breads with Butter, or Batter Cakes, Sirup,
Bread and Coffee.

DINNER—Soup,
Meat, roasted, boiled or fried, or Fish,
Two Vegetables,
A Vegetable or Pickle Salad (frequently),
Dessert,
Bread and Coffee, or Tea, or Chocolate.

SUPPER—Meat or Fish in some form,
One Vegetable,
Hot Rolls and Stewed Fruit, or Jam,
Bread and Coffee, or Tea, or Chocolate.

15 MISCELLANEOUS ARTICLES

Baking Powder. One ounce to each pound of flour, for biscuits, or batter cakes. With excellent baking powder, the amount may be reduced to ¾ or even ½ of an ounce per pound of flour.

Beans or Peas, Dried. The volume increases nearly three and one-half times in cooking. See following table for quantity.

Breakfast Foods. Oatmeal, cornmeal, hominy, etc., one gallon of water and one and one-fourth pounds of cereal for each twenty men.

Buns, Etc. One gallon dough mixture for each forty men. Takes one gallon of liquid and about fifteen pounds of flour.

Butter. One-half ounce per man, generally with hot cakes for breakfast, or with biscuits or hot rolls for supper. The allowance is based upon such use once each day.

Coffee. Allow one pint of liquid coffee per man for breakfast, using five ounces of roasted and ground coffee per gallon of water. For each gallon of water added for dinner add four ounces of coffee; for each gallon added for supper, allow three ounces of coffee. Clean out boiler and start fresh.

Dried Fruit. Increases about three-fold in cooking. See following table for quantity.

Eggs. Allow two or three eggs per man, depending upon the variety of other components of the meal.

Ice Cream. One gallon of the original mixture for each twenty men. Its volume increases about one-fifth while freezing.

Jam. Allow one No. 2 can for each six men.

Meats. See following table for quantity.

Milk, Evaporated. For general table use, mix one part of evaporated milk with three parts of water. When used in coffee, take one 16-ounce can for five gallons of coffee.

Pickles. One gallon for 100 men.

Rice. The volume increases from three and one-half to four times in cooking. See following table for quantity.

Sauerkraut. One gallon for twenty men.

Sirup. One gallon for forty men, for hot cakes, fried mush, etc. With bread a smaller amount will be required.

Soup. One gallon for each ten men.

Sugar. For coffee or tea, allow four ounces to the gallon; for cocoa, allow six ounces to the gallon.

Sweet Corn. Allow two medium sized ears to each man.

Tea. Allow one pint per man. One-half ounce of tea to the gallon of water will make rather weak tea; three-fourths ounce, tea of medium strength; one ounce, very strong tea. Let the tea "draw" about eight minutes; then remove the leaves and throw them away.

Vegetables. See following table for quantity.

TABLE SHOWING QUANTITIES OF MEATS, VEGETABLES AND FRUITS TO PREPARE FOR EACH MEAL.

B, D & S are for breakfast, dinner and supper, respectively.

MEATS.	1 Ration			5 Rations			10 Rations			50 Rations			REMARKS
	B. oz.	D. oz.	S. oz.	B. lb.	D. lb.	S. lb.	B. lb.	D. lb.	S. lb.	B. lb.	D. lb.	S. lb.	
Bacon,	3	5	4	1	1½	1¼	2	3	2½	10	15	12½	Especially for breakfast
Beef hearts,	4	6	5	1¼	2	1½	2½	4	3	12½	20	15	Generally for dinner or supper
Beef liver and bacon,	3½	4	3½	1	1¼	1	2¼	2½	2¼	11	12½	11	
Beef loaf,	1½	2	2	½	¾	¾	1	1½	1¼	5	6½	6	Especially for breakfast
Beef steak,	3	4	3½	1	1¼	1	2	2½	2¼	10	12½	11	Especially for supper
Frankfurters,	4	7	5	1¼	2¼	1½	2½	4½	3	12½	22	15	Appropriate for any meal
Hamburg steak,	4	6	5	1¼	2	1½	2½	4	3	12½	20	15	Generally for dinner or supper
Pork sausage,	4	6	5	1¼	2	1½	2½	4	3	12½	20	15	Especially for breakfast
Pork spare ribs,	5½	7	6	1¾	2¼	2	3½	4½	4	17	22	18	Especially for breakfast
Roast beef, veal or mutton,	6	9	7	1¾	2¾	2¼	3½	5½	4½	18	28	22	Generally for dinner or supper
Fish, large, for steak,	4	7	5	1¼	2¼	1½	2½	4½	3	12½	22	15	Generally for dinner
Fish, small, trout, perch, etc.	5	8	6	1½	2½	2	3	5	3½	15	25	18	Appropriate for any meal
Chicken, drawn turkey, or duck, roasted or fried,	7	9	8	2¼	2¾	2½	4½	5½	5	22	28	25	Appropriate for any meal
	8	12	10	2½	3¾	3	5	7½	6	25	37½	30	Generally for dinner

B, D & S are for breakfast, dinner and supper, respectively.

VEGETABLES.	1 Ration B. oz.	D. oz.	S. oz.	5 Rations B. lb.	D. lb.	S. lb.	10 Rations B. lb.	D. lb.	S. lb.	50 Rations B. lb.	D. lb.	S. lb.	REMARKS.
Beans, baked issue, (with 1-5 the amount bacon),	3	4	3½	1	1¼	1	2	2½	2¼	10	12½	11	Principal vegetable
Beans, Lima, or pease	—	1½	1	—	½	¼	—	1	¾	—	5	3	Second vegetable
Cabbage, untrimmed,	—	8	6	—	2½	2	—	5	4	—	25	20	Second vegetable
Macaroni or Spaghetti,	—	1	1	—	½	¼	—	1⅛	⅝	—	5½	3	Second vegetable
Onions, peeled, boiled or creamed,	—	4	3	—	1¼	1	—	2½	2	—	12½	10	Second vegetable
Potatoes, peeled, fried or boiled	4	6	5	1¼	2	1½	2½	4	3	12½	20	16	Principal vegetable
Rice,	1	1½	1	¼	½	¼	½	1	⅝	3	5	3½	Second vegetable
Spinach,	—	5	4	—	1½	1¼	—	3	2½	—	15	12½	Second vegetable
Tomatoes, stewed or scalloped,	3	5	4	1	1½	1¼	2	3	2½	10	15	12½	Second vegetable
Sweet potatoes,	4	6	5	1¼	2	1½	2½	4	3	12½	20	16	Principal vegetable
Turnips,	—	4	3	—	1¼	1	—	2½	2	—	12	10	Second vegetable
FRUITS.													
Dried fruits,	1	1½	1	¼	½	¼	⅝	1	⅝	3	5	3	For breakfast or supper
Blackberry jam,	3	5	4	1	1½	1¼	2	3	2½	10	15	12½	For breakfast or supper

CHAPTER VI

BILLS OF FARE FOR GARRISON

17. **Bills of Fare.** The following bills of fare have been prepared as a general guide for all seasons of the year, and it is considered that they present the maximum variety that can be attained under the most favorable circumstances rather than what can be provided as a general rule at all stations and at all seasons of the year. They should therefore be considered rather as suggestive of Bills of Fare than as a prescribed schedule to be followed regardless of circumstances.

General scheme for preparing Bills of Fare. Each day immediately after dinner the menu is made out for supper in order to use up all portions of food left over from breakfast and dinner while they are still fresh; and at the same time the Bills of Fare are prepared for Breakfast and Dinner for the following day. For example mush left over from breakfast may be sliced when cold, fried and served with syrup; or, fritters may be made from it. There may be material for creamed potatoes, fried potatoes, potato balls, a salad, meat balls, croquettes, beef loaf, etc., left over from breakfast and dinner, or by preparing a small amount of the same kind of food as that left over, the whole may be used up to advantage.

At all times the available supplies must be borne in mind and due consideration given to those that must be used up first to prevent deterioration.

18. **Location and Season** have much to do with

determining the variety that can be supplied from other sources than the Government Straight. General garden truck, fresh vegetables, berries, fresh fruit, fish, pork, etc., all have their seasons and every advantage must be taken to supply a constant variety and to provide daily changes in the Bills of Fare. Men generally crave the several classes of food as their seasons approach or are at their height, and much benefit and economy will result by watching the markets and the corresponding prices of the articles of the ration that can best be saved with a view to purchasing the articles desired.

A good company garden will do much to assist in rounding out the Bills of Fare. Fresh green onions, lettuce, radishes, pease, string beans, etc., are always acceptable and should be planted at such intervals of time as to insure a constant fresh supply for the table during the season.

Apples, turnips, sweet potatoes, cabbages, pumpkins, etc., can frequently be purchased from farmers in quantity for delivery from time to time during the fall and winter months, and at a great saving over the market prices. From our experience we are of the opinion that it is best to have the above mentioned articles taken care of by the producer and delivered as required rather than to attempt to keep them in root-cellars or basements of barracks.

Dried vegetables. The several varieties of beans, pease, rice, hominy, sweet corn, etc., naturally increase in importance in the company mess with the approach

of winter and the disappearance of the green vegetables and garden truck.

Winter season for meats. The variety of meats that can be handled to advantage during the winter months is considerably greater than at other seasons on account of the ease with which they may be transported and preserved.

19. **Variety in Flavor.** See that repetition is avoided in the same Bill of Fare. For example, a bean soup, bean salad, and beans served as a vegetable; or, tomato soup, and tomato salad or tomatoes served as vegetable produce an unnecessary sameness of flavor in a meal that can just as well be avoided; but with reference to the manner of cooking, a distinctly "boiled dinner" or "baked dinner" is often desirable.

Seasoning of food. Remember that the proper seasoning of food is half the preparation for the table.

Remember that a *few well prepared items* on the Bill of Fare is infinitely better than a greater number of dishes that have been hastily thrown together in a slovenly manner.

20. **Season and Climate. Character of Work.** The general character of the Bills of Fare will be greatly influenced by the particular nature of the work being performed by the men. The heavier foods such as bacon and beans, stewed dried vegetables, much meat, plum duff, etc., will naturally give way to fruits, cereals, and such light desserts as ices, gelatine, berries, cornstarch puddings and custards, upon a change from a cold to a warmer climate, or from active field service to a long voyage aboard the transport.

21. **In the Preparation of Bills of Fare** remember that meat or some substitute for it forms the basis for all meals in the Army Kitchen and that as an item on the Bills of Fare it should be considered as the nucleus about which the other articles are arranged so as to produce a well balanced menu.

Dinner. *Soup* should generally be provided for every dinner. Rest assured that it will be consumed with relish if carefully made and properly served. At this Training School we have served it almost daily for the past three years to about 15 permanent organizations and it is consumed today with as great relish as when first placed on the Bills of Fare.

So far as practicable a *salad* should be provided and *two kinds of vegetables.* The variety of *meats, desserts* and *drinks* will best be appreciated by reference to the Bills of Fare that follow. Frequently it is not considered necessary to serve any beverage other than water when soup is on the Bill of Fare, but in preference to serve stronger coffee for breakfast. Tea or cocoa should be served frequently at this meal in the place of coffee. Iced tea is much appreciated during the summer months.

Supper. The menu for supper is generally very largely regulated by the untouched food left over from breakfast and dinner. Very frequently *a good salad*—at least a "side dish"—can be prepared from such cold beans, cold boiled potatoes, sliced onions and pickles as may be at hand. In addition a substantial *vegetable* must be prepared; generally it will be some form of potato as browned, french fried, creamed,

hashed, or in the form of potato balls. The meat for this meal may appear in the form of steaks, but more generally in a curry, chili con carne, pot pie, stew, or some form of croquette, meat ball, loaf or in hamburg steak in order to use up all odds and ends in a palatable form. This is the most convenient and appropriate meal with which to serve Parkerhouse Rolls, Tea Buns, Biscuits, Coffee Cake, and all sweet dough mixtures with butter or with stewed fruit or fruit butter. Much benefit will be derived from a study of the Bills of Fare that follow.

BILLS OF FARE: BREAKFAST.

	FRUITS	BREAKFAST FOODS, ETC.	VEGETABLES	MEATS, ETC.	HOT BREADS, ETC	DRINKS
1	Stewed prunes	Force and milk	German fried potatoes	Pork sausage gravy	Bread	Coffee
2	Fresh apples	Corn meal, milk		Beefsteak, gravy	Buckwheat cakes	Coffee
3	Stewed peaches	Corn mush, sirup		Corned beef hash	Hot biscuits, butter	Coffee
4	Grapes or baked apples	Shredded wheat and milk		Irish stew	Hot muffins and sirup	Coffee
5	Fresh fruit	Cream of wheat and milk	Boiled potatoes	Mutton chops, gravy	Bread	Coffee
6	Apple butter	Puffed rice, milk	French fried potatoes	Fried bacon and brown gravy	Spiced cup cake and bread	Coffee
7	Stewed raisins	Post Toasties and milk	Baked potatoes	Pork chops	Bread and butter	Coffee
8	Stewed apricots	Uncle Sam, milk	Lyonnaise potatoes	Liver and bacon and gravy	Corn muffins, bread	Coffee
9	Stewed figs	Wheatine, milk	Fried potato saute	Vienna sausage and gravy	Hot cakes and sirup	Coffee
10	Baked apples			Beef pot pie	Hot toast and butter	Coffee

BREAKFAST—CONTINUED

	FRUITS	BREAKFAST FOODS, ETC.	VEGETABLES	MEATS, ETC.	HOT BREADS, ETC	
11	Bananas and cream	Hominy, sirup	Browned potatoes	Beefsteak sm'th'd in onions, gravy	Bread	
12	Fresh plums	Milk toast	Fried onions	Hamburg steak and gravy	Bread and butter	
13	Currant jelly	Cerealine Flakes	French fried potatoes	Beef fritters, tomato gravy	Corn fritters, bread	Coffee
14	Fresh fruit	Corn mush, milk	Baked potatoes	Veal cutlets, gravy	Oat meal fritters and bread	
15	Blackb'ry jam	Egg-O-See, milk	Boiled potatoes	Ham and eggs	Spiced cup cake	Coffee
16	Raspberry jam	Wheatine, milk	French fried potatoes	Fried chicken, gravy	Hot cakes, sirup and bread	Coffee
17	Tomato preserves	Post Toasties and milk	Creamed potatoes	Fried rabbit, gravy	Fried mush, sirup and bread	
18	Apricot butter	Puffed rice, milk		Mutton pot pie	Hot biscuits, butter	Coffee
19	Stewed peaches	Milk toast	Baked potatoes and butter	Cold sliced ham	Buckwheat cakes, sirup, bread	Coffee Coffee Coffee
20	Bananas and cream	Shredded wheat and milk	Browned potatoes	Fried liver, gravy	Corn batter cakes and sirup	Coffee

DINNER

Note: Bread served with all meals. * is Friday. † is Sunday.

	SOUP	SALADS, ETC.	VEGETABLES	MEATS, ETC.	DESSERT	DRINKS
1	Bean	Lettuce salad	Mashed potatoes lima beans	Roast beef, gravy	Apple pie	Coffee
2	Barley and tomato	Pickles and sliced onions	Boiled potatoes mashed parsnips	Beefsteak sm'th'd in onions, gravy	Date pie	Coffee
*3	Clam chowder	Hot slaw	Creamed potatoes green peas	Fried fish	Lemon meringue pie	Coffee
4	Beef	Cabbage salad	Browned potatoes kidney beans	Beef a la mode	Rice pudding	Coffee
†5	Pea	Pickles, green onions	Stewed brown beans mashed potatoes	Roast pork, gravy apple sauce	Pumpkin pie	Lemonade
6	Noodle	Bean salad, radishes	Browned potatoes creamed cauliflower	Roast mutton gravy	Apricot pie	Cocoa
7	Macaroni and tomato	Piccalilli salad	Hashed potatoes mashed turnips	Soft roast beef gravy	Baked apples with sauce	Tea
8	Okra	Beet salad	Boiled potatoes scalloped cabbage	Pot roast beef gravy	Blackberry pie	Coffee
9	Cream of cabbage	Cucumber and onion salad	Mashed potatoes stewed beans	Pork sausage	Peach pie	Coffee
10	Rice and tomato	Cold slaw	Browned potatoes	Rare beef roast broth gravy	Prune pie	Cocoa

DINNER—CONTINUED

Note: Bread served with all meals. * is Friday. † are Sundays. ‡ is a German dinner.

	SOUP	SALADS, ETC.	VEGETABLES	MEAT, ETC.	DESSERT	DRINKS
*11	Potato cream	Cold slaw	Green peas creamed potatoes	Boiled fish, cream sauce	Pineapple meringue pie	Coffee
†12	Oxtail soup	Lettuce salad	Mashed potatoes lima beans	Chicken pot pie	Cocoa meringue pie	Coffee
13	Chicken rice	Tomato salad	Baked beans	Boiled bacon	Plum duff	Tea
14	Corn chowder	String bean salad	Boiled potatoes cabbage	Corned beef	Pear pie	Coffee
15	Oyster	Pickles and green onions	Boiled potatoes string beans	Roast beef, gravy	Gelatin (lemon)	Cocoa
‡16	Potato	Horseradish	Sauerkraut and Vienna sausage	Potato salad	Cr'm. cheese pie Vienna rolls	Coffee
17	Split pea	Beet salad radishes	Mashed potatoes creamed asparagus	Beef hearts, gravy	Rhubarb pie	Tea
18	Vegetable	Cabbage salad	Creamed potatoes	Boiled beef and dumplings	Raisin pie	Coffee
†19	Vermicelli	Cucumber salad radishes, onions	Browned potatoes mashed squash	Roast pork with apple sauce	Corn starch pudding	Coffee
20	Beef tea	Bean salad	Boiled potatoes succotash	Beefsteak, gravy	Bread pudding	Coffee

SUPPER

Note: Bread is served with all meals.

	SALADS, ETC.	VEGETABLES	MEATS	HOT ROLLS, SAUCE, BUTTER	DRINKS
1	Pickles	Potatoes, hashed	Beef fritters tomato sauce	Apple cake	Cocoa
2	Cabbage salad	French fried potatoes	Codfish balls, gravy	Stewed peaches, braided bread	Coffee
3	Lettuce salad	German fried potatoes	Corned beef hash	Stewed prunes, Jenny Linds	Tea
4	Cucumber salad	Fried rice	Beef Spanish	Currant rolls	Coffee
5	Green onions radishes	Boiled potatoes	Fried bacon, gravy	Corn muffins, sirup	Coffee
6	Pickles	Macaroni and cheese	Beef pie	Parker house rolls, butter	Cocoa
7	Piccalilli	Stewed kidney beans	El rancho	Tea buns	Coffee
8	Onion salad	Cold potatoes fried egg plant	Stewed tripe	Coffee cake	Tea
9		Mashed potatoes	Beefsteak, mushrooms	Pocketbook rolls, butter	Cocoa
10	Hot slaw	Boiled rice	Beef Turkish	Apple sauce, cinnamon rolls	Tea

SUPPER—CONTINUED

Note: Bread is served with all meals.

	SALADS, ETC.	VEGETABLES	MEATS	HOT ROLLS, SAUCE, BUTTER	DRINKS
11	Bean salad	Browned potatoes	Meat balls, gravy	Milk rolls, butter	Coffee
12		Boiled potatoes	Beefsteak pudding	Apple sauce, sandwich buns	Tea
13	Pickles	Sweet potatoes candied	Stew and dumplings	Stewed peaches, split rolls	Coffee
14	Cabbage salad	Succotash	Beef hash	Cranberry sauce, cross rolls	Tea
15	Beets	Boiled rice	Beef curry	Cake and ice cream	Iced Tea
16	Piccalilli salad	Potato salad	Cold roast beef	Cup cakes, apple sauce	Iced Tea
17	Cold slaw	Boiled potatoes	Beef cheese	Stewed prunes, apple cake	Coffee
18	Lettuce salad	Mashed potatoes	Chili con carne	Apfel Kuchen	Iced Tea
19	Green onions radishes	Potato salad	Cold corned beef	Doughnuts, apple sauce	Cocoa
20	Onion salad	Fried potatoes	Hamburg steak, gravy	Stewed prunes, sandwich buns	Coffee

Table for computing the gross weight and cubic measurement of any number of rations, and the amount of transportation necessary for the various kinds of rations in box cars, army wagons, and ship's tons.

Kind of ration.	Gross weight of one ration	Rations to a 40,000-pound box car.	Part of box car required for one ration	Rations to an army wagon (3,000 pounds)	Cubic feet to one ration	Rations to a cubic foot.	Rations to a ship's ton.	Part of a ship's ton required
	Lbs.							
Garrison ..	4.9	8,226	0.000122	600	.149	6.73	269	0.0037
Travel	4.1	9,818	.000102	750	.129	7.76	311	.0032
Reserve ..	3.0	13,428	.000075	1,000	.111	9.04	362	.0028

Freight tonnage or measurements of ship's cargo is 40 cubic feet of space per ton.

When rations obtained from the Commissary are found by a surveying officer to be deteriorated, lost, or destroyed, so that those for whom they were procured were insufficiently subsisted and money is expended from the company fund for necessary subsistence, the company fund may be reimbursed by the subsistence department for the amount so expended upon a full statement of the circumstances of the case and the approval of the Secretary of War. Par. 187, Subsistence Manual, 1910.

After rations leave the commissary they are in the keeping of the troops, and any loss sustained is theirs. Par. 188, Subsistence Manual, 1910.

Note that turkey is sold for Thanksgiving and Christmas only, and that chicken is no longer supplied. General Orders, No. 15, War Department, 1911.

CHAPTER VII

FRESH BEEF, SPECIFICATIONS, SEX, AGE AND QUALITY

22. **Specifications.** *Fresh Beef;* To be good in quality and condition, fit for immediate use, and from fore and hind quarter proportionally, including all the best cuts; no carcass to weigh less than 500 pounds when trimmed; neck to be cut off perpendicularly to the line of vertrebræ, leaving but 3 cervical vertebræ on the carcass; the shanks of the forequarter to be cut off at the kneejoint and of hind quarters at the hock (commercial cut), and to compensate for the shank bone thus allowed to remain, 2½ pounds will be deducted from the weight of each forequarter and 3½ pounds from each hind quarter; difference in weight between fore and hind quarters not to exceed 20 pounds. *Necks, kidney fat, beef from bulls, and stags, and from females (except spayed heifers) will be excluded from delivery.* (For specifications for frozen beef and for mutton see par. 331, Manual for Subsistence Department, 1910).

23. **Remarks on Specifications.** In order that the difference in weight between fore and hind quarters shall not exceed the limit (20 pounds), *the cut must be made so as to leave one rib only on the hind quarter,* and this is the ordinary packing house cut.

The minimum weight is placed at 500 pounds to insure getting a proper proportion of meat to bone.

The specified neck cut is unusual in commercial transactions, and the delivery will generally be made with 5 or 6 neck vertebræ left on the carcass unless special

attention is paid to this trimming. The neck meat is worth commercially about one-half the contract price for the carcass and it should be accepted under no circumstances.

The deduction of two and one-half pounds for the shank of the forequarter and of three and one-half pounds for the hock (both of which were formerly cut off before delivery) is very apt to be overlooked by the contractor unless specially cautioned by the responsible person. Neglect to make the neck and shank trimmings and deductions net the contractor more than $2.00 a carcass even when the price is as low as 7 cents per pound.

By "Kidney Fat" is meant the fat immediately surrounding the kidneys and does not refer to other suet in the hind quarter.

The meat from bulls, stags and cows is excluded for the reason that it is inferior to that from the steer of the same age and condition. A careful study of the characteristics that definitely determine the differences between these classes of carcasses is necessary in order to protect the interests of the government and of the companies, and they are clearly shown in the accompanying cuts.

24. **Sex.** *By definition, the bull is the uncastrated male* and the stag a male castrated late in life. In practice, a bull is castrated when he has served his purpose, and economy requires that he should be placed on the market. Being castrated he takes on flesh and fat and brings a better price at the stock yards. As a bull he will rarely fatten under any circumstances,

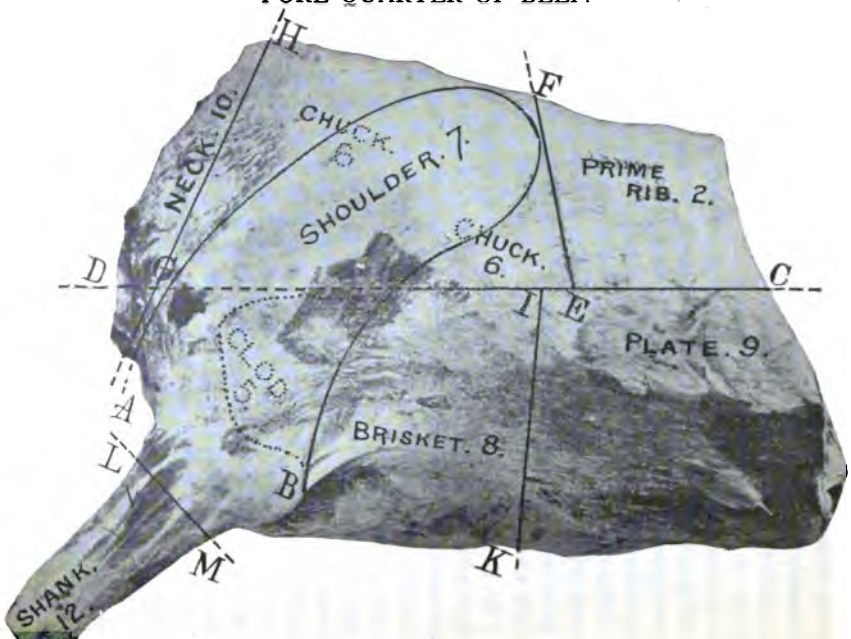
but in either case, the flesh is very dark—very conspicuously so—and the muscles "stand out," hard and compact, especially on the shanks. In the cod there is almost an entire absence of scrotal fat. The carcass of the bull or stag shows massive shoulders, a thick, bulging neck, broad chest, a very round rump and a coarse-grained flesh. His forequarters are relatively larger than his hindquarters. His general make-up is so different from that of the steer that if after careful examination of the carcass a doubt exists as to whether it is a steer or a stag (or bull), the chances are that it is a steer.

The flesh of bulls and stags is drier than that of steers and cows, and is used to advantage in bologna and sausages, as when cured it will have taken up and retained more moisture than other classes of beef. As a rule contractors will not now attempt to run in such meat in quantity, but if it is delivered it should be promptly rejected. It is generally tough and unsuited to company use.

A steer is a male not full grown and castrated when young, and an *ox* the corresponding full grown animal. Generally speaking, we call the meat from the carcass of either "steer meat," and for army use the only beef delivered should be from such animals from 2 to 6 years of age, excepting only the meat from "spayed heifers," which is occasionally supplied.

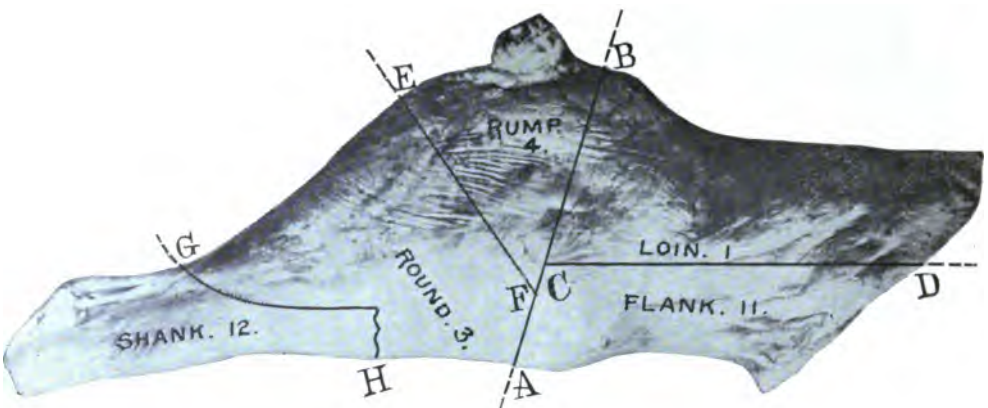
A spayed heifer is a female from which the ovaries were removed early in life. Cows are sometimes spayed after having had one or more calves, if it is necessary to let them run at large with the herd while preparing

FORE QUARTER OF BEEF.



Heavy lines show the first cuts made upon receipt of quarter for any purpose whatever. Cut in order A. B. C, D. E. etc. Cut from A to B to remove shoulder, using the knife only. Numbers refer to general value of each cut for company use.

HIND QUARTER OF BEEF



Heavy black lines show the first cuts made upon receipt of quarter for any purpose whatever. Cut from A to B just in front of joint, E to F just under aitch bone, and G to H, using knife only. Numbers refer to general value of each cut for company use, considering both quarters together.

them for the market, but if the operation has been performed at all the scar should generally be plainly visible in the left flank (though the ovaries are sometimes otherwise removed).

A cow is a female that has had a calf. A maiden heifer is an adult female that has not been allowed to breed.

Cows are frequently not placed on the market until much benefit has been derived from them either for dairy or breeding purposes, and consequently, they are generally older than steers when slaughtered. If killed within a certain period before or after calving they are considered unfit for food.

Generally speaking, a steer produces considerably more flesh to bone than the cow, and the carcass of a steer at the present time brings from 2 to 2½ cents per pound more than that of a cow in the same condition. This explains the tendency of contractors to run in cow meat whenever it will be accepted.

The accompanying photographs with explanations will render the determination of sex in dressed beef a simple matter.

25. **Age and Quality.** *The age of dressed beef* can be estimated by the character of the cartilage tipping the spines of the dorsal vertebræ; by that between the vertebræ throughout the spinal column, and in the brisket, sufficiently well to indicate the toughness or tenderness of the beef so as to regulate its acceptance or rejection. When the layers of cartilage between the vertebræ become so tough and hard as to resist the penetration of the point of a skewer of soft pine wood,

the quarter should generally be rejected. The eye will note as accompanying this condition a very limited amount of cartilage in the brisket—practically none in the cow—the bones of the sacrum will have generally grown into a solid mass, with few or no lines of demarcation between the several vertebræ; the cartilaginous extensions of the spines of the dorsal vertebræ will be more bone than cartilage (in the cow they will be solid bone); the diaphragm will be exceedingly tough; the bones will present a bleached out appearance instead of being ruddy or full of blood as in youth, and the marrow will be hard and light yellow or almost white instead of soft and red. Generally the fat will be hard and yellow instead of soft and white as in youth, although in some breeds of cattle the fat is naturally yellow at all ages. The cartilage of the joints will be pale white instead of having a bluish tinge as in youth, and more or less "water" may be present.

The flesh of veal is of a pale red color. That of a steer should be a bright red—a deeper red indicates greater age and toughness. The flesh of the cow is generally darker than that of a steer in the same condition. The flesh of bulls and stags is very dark—so dark that it should at once be detected. Color in meat should be judged from portions that have been cut a few minutes. Freshly cut portions and those that have been exposed to the air for a considerable period present an unnaturally dark appearance.

(For method of telling age of cattle on the hoof see paragraph 153, Sub. Manual 1910).

In passing upon meat it should be remembered that

the contract specifications are so definitely stringent, so far as the contractor is concerned, and so liberal with respect to the troops, that almost any quality of beef can be procured that is insisted upon by the Commissary and the Post Commander. It is contemplated by the Subsistence Department that the beef shall be "good in quality, and condition," etc., and contractors regulate their bids by the interpretation they have noted has been made as to the same by the post authorities, and a different and more particular insistence as to the literal fulfillment will necessarily result in higher bids and an increased cost of the ration.

It is considered, however, that regardless of what may have been the contractor's estimate of the situation at any particular post, he should be required to comply strictly with the specifications as to *sex, weight of carcass, trimming of necks and allowance of weights for shanks, etc.*, but that a reasonable interpretation should be put upon the clause referring to "quality and condition." *Beef for Army use should be only moderately fat,* though the fat should be well distributed and the cuts of lean meat present a marbled appearance. Beef in good condition and otherwise complying with the contract should be accepted if between 2 and 6 years of age. It is perfectly evident that we cannot expect to supply corn fed beef from native stock, say of 2 years of age and younger, as a part of the regular ration.

Steer—HINDQUARTERS—Cow

Note that in the **Cow Carcass** the hock is relatively delicate and slender, the parts above generally slightly "dished," the hip bone (see arrow point) very prominent, the loin not well filled, and the back bone at this point generally broken. In the *Steer Carcass* note the coarse hock, plump round, the straight hip, plump loin, and straight firm backbone.

COW AND STEER CARCASSES of about the same age, condition and general appearance are represented.

The Cow Carcass. Note in comparison with the steer, the slender hock and the dished-in appearance between the hock and rump; that the exterior fat of the carcass meets the end of the *aitch bone* at *a'*; that the inner end of the aitch bone is slightly refused, providing a broader passage for giving birth to a calf.

The rump bones at *b'* are separated in youth, but become solid at about 3 years of age, leaving no lines of demarcation.

The formation at *a'* cannot be greatly altered for the purposes of deception, and this with the udder, if not cut away, are the positive proofs of sex.

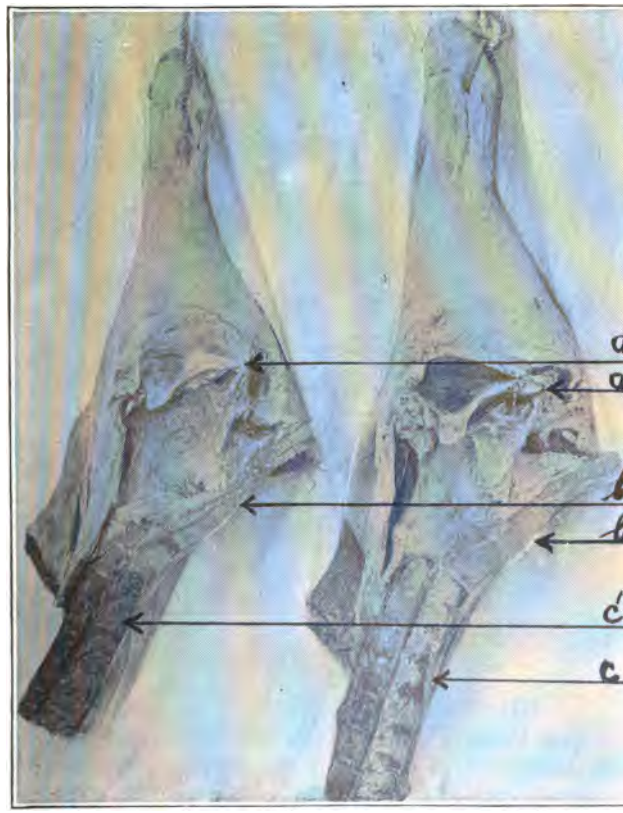
The backbone at *c'* seems to be relatively weak and is generally broken during cleavage while dressing the carcass. The loin at this point generally presents a dished-in appearance.

The Steer Carcass. Note in comparison with the cow, the large hock, the plump appearance between the hock and rump; that the exterior fat of the carcass is separated from the aitch bone at *a* by about 2 inches of lean meat, to which a portion of the penis is generally still attached, as shown in the photograph; that the inner end of the aitch bone juts into the passage, narrowing it.

The rump bones at *b* do not grow together as early as in the cow, and show distinct lines of demarcation up to about 6 years.

The formation at *a* and the presence of the *cod* (scrotal fat) are positive proofs of sex. If the cod has been cut away, it is sufficient cause for rejection, as this is generally done only for the purpose of making the cow and steer carcasses appear so much alike that cow carcasses can be run in on the contract.

The backbone at *c* is firm and the loin near this point straight or plump.



Cow. HINDQUARTERS. Steer.
Each 4 year old.

HINDQUARTERS—COW. 5 years old.

Cow Carcass. The quarter here represented may be considered as typical of the grade of cow meat generally presented for acceptance. Note the slender hock, the "dished-in" appearance above, the long straight *aitch bone* meeting the exterior fat at *a*, the broad passage at *b*, the solid rump at *c*, the broken back at *d*, and how the udder has been cut out and skewers put in at this point.

HINDQUARTER—STEER. 4 years old.

Steer Carcass. Note the typical formation at *a*, the narrow passage at *b*, the lines of demarcation between the bones of rump at *c*, and the lumps of fat at *d* forming the *cod* or *scrotal fat.* Note also the straight, firm loin in contrast to the weak loin shown at *d* in the cow.

Steer Carcass. Note that the spines of the *dorsal vertebra* are tipped at *a* with white cartilage called "buttons." In very young animals, this cartilage is perfectly white. In the 2-year old animal little red spots appear. At 3 they are more numerous. At 4 little bony islands form. At 5 there is more bone than cartilage. At 6 there is but a narrow strip of white cartilage left surrounding the bone that has formed, but the line of demarcation between "Spine" and "Button" is distinct. By 9 years of age the button is solid bone and at 12 is of the same color as the bone of the spine. If 6 or older the beef should be rejected.

Note that at the forward end of the breast bone at *b* solid white cartilage is found. It disappears with age as do the "buttons." There is also a relatively large amount of cartilage between first and second bones of the breast.

The ribs are distinctly curved lengthwise and also in cross section. They *extend perpendicularly outward* from the back bone at about the fifth vertebrae from the rear.

The knee is coarse.

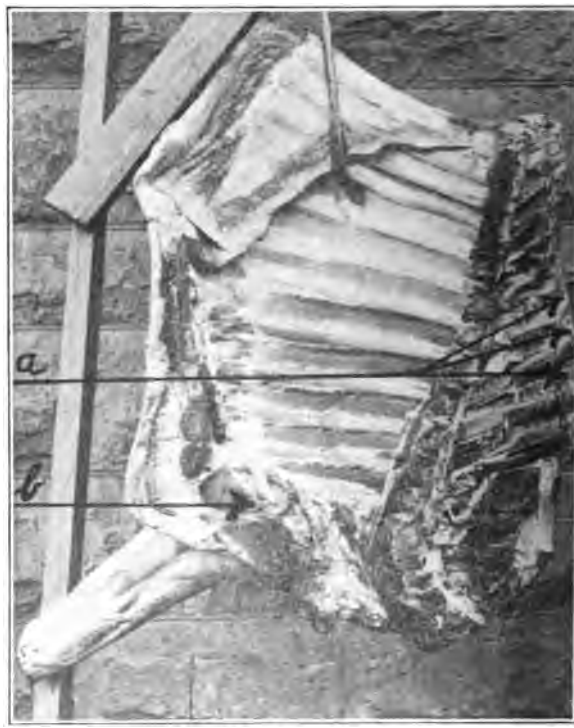
Cow Carcass. Note the absence of the buttons at *a'* referred to above. They appear in the heifer as in the steer, but generally disappear entirely between 2 and 3 years of age leaving no lines of demarcation. If none are present the quarter should be rejected.

In comparison with the steer there is very little cartilage at *b'*.

The ribs are straighter than in the steer and quite flat. They begin to *bend backward* at about the fifth vertebrae from the rear.

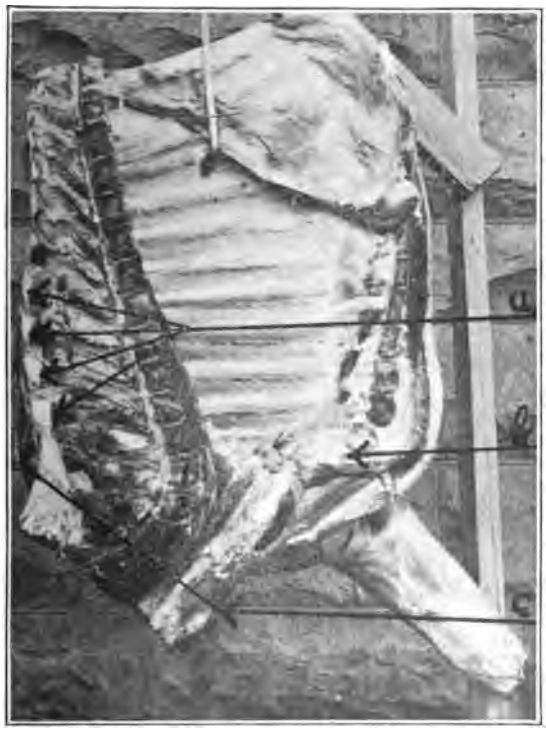
The knee is slender.

a'
b'
a
b
c



FOREQUARTER OF COW

To illustrate especially the absence of cartilage at *a*, the bony formation at *b* and oblique angle of the ribs to back bone at about the fifth vertebræ from the rear. 4 years old.



FOREQUARTER OF STEER

To illustrate especially the "buttons" of the spines of the back at *a*, the cartilage at *b* just beginning to turn to bone, the prependicularity of the ribs to the spinal column at about the fifth vertebræ from the rear, and the point *c* at which the neck should be trimmed off. 4 years old.

Cow—FOREQUARTERS—Steer.

To illustrate especially the *thin neck* A of the *cow* as compared with the *thick neck* B *of the steer.*

SIDE OF HEIFER.

This animal was about 9 months old. Note the characteristic formation at *a*, the distinctly separated bones at *b*, the "buttons" *c*, amount of cartilage at *d*, and where the neck is cut off according to contract at *e*.

IMPROVISED FIRELESS COOKER.

Most satisfactory fireless cooker yet devised, being a water can (or ash can), milk can arrangement with hay or straw for packing. In camp, large cans are used for water and the smaller ones for cooking, so that no unnecessary impedimenta is carried.

CHAPTER VIII

FIRELESS COOKERS

26. The "Fireless Cooker" may be defined as a device constructed for the reception of hot food, or for the hot articles from which it is being prepared. It consists essentially of such non-conducting materials as may be necessary to maintain the food at a proper temperature for cooking for a number of hours.

It is generally a box-like arrangement, lined with a non-conducting material, within which is the "well" or reservoir. into which the vessel containing the hot soup, coffee, meats, vegetables, etc., is placed.

Many different makes of fireless cookers are found on the market, and various materials—asbestos, paper, felt, hay, indurated fiber, etc.,—are used as non-conductors. In some types, heated soap stones are placed in the "well" to keep the food at a cooking temperature for long periods, or to actually supply the heat ordinarily given to the food by placing it upon the range or in the oven.

Generally, during the ordinary process of cooking, a certain amount of heat is continuously applied to the vessel containing the food, and after it has attained a certain temperature, the heat required is but little more than sufficient to replace that lost by radiation, evaporation, etc. To cook food simply requires the application of a certain amount of heat at a temperature between 130 degrees and 385 degrees Fahr. (in the case of fireless cookers, between 130 and 212 degrees Fahr.), though the lower the temperature, the longer the process will be.

The object of the fireless cooker is simply to prevent the loss of heat from food containing a sufficient number of heat units above 130 degrees Fahr., to cook it, thus effecting a great saving of fuel and incidentally rendering it unnecessary for one to give his constant attention to the food being cooked. Furthermore, some

articles are actually better when prepared in a fireless cooker, e. g., tough meats that are ordinarily improperly cooked by any quick process, are rendered more tender and palatable by the long slow process required when the fireless cooker is used.

To get the best results, most articles of food to be cooked should be covered with liquid when put into the cooker.

Such vegetables as potatoes, parsnips, etc., should be about half cooked before putting in the cooker, the water drained off, and the tubers or roots allowed to finish cooking with the retained heat. Such articles should preferably remain in the cooker for a few hours only.

A considerable amount of acid is found in tomatoes, and dishes containing them in quantity should not be permitted to remain in the fireless cooker or other tin receptacle for longer than four or five hours.

Tea and coffee should be prepared in the utensils provided, and the tea leaves or coffee grounds (which should have been tied loosely in a sack), should be removed before setting the same in the cooker.

To get the best results, the vessels should be well filled, and where two or more "wells" are provided, all should be used if practicable.

To prepare food for the fireless cooker, the general idea is to place it on the range until the articles to be cooked are heated through, or have taken up such an amount of heat that, when transferred to the cooker, they will contain within themselves sufficient heat to complete the process. By experience, the following times of cooking, etc., have been ascertained:

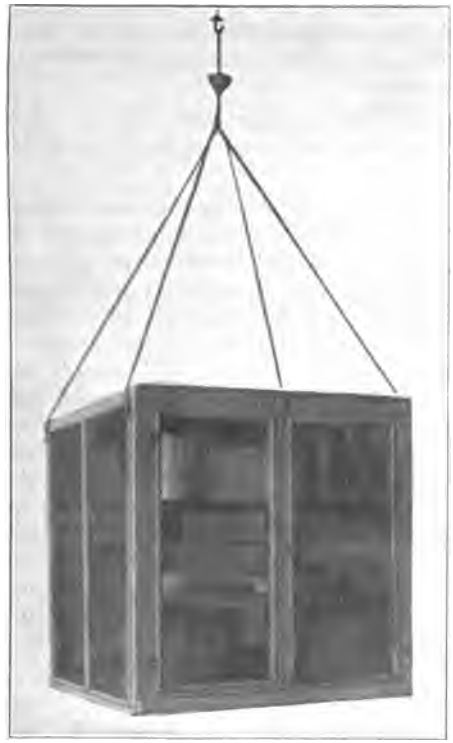
FIRELESS COOKER ISSUED, FOR TRIAL, BY THE SUBSISTENCE DEPARTMENT

This type of fireless cooker is too heavy for field use and the practical results attained are no better than with the water-can-milk-can arrangement. This particular cooker is best used in garrison.

Articles of Food.	No. of minutes at boiling point before putting in cooker.	No. of hours in the fireless cooker.
Beef, à la creole,	45	6
Beef, à la mode	45	3
Beef, corned,	45	3
Beef, curry of,	20	3
Beef roast, soft,	45	3
Beef, Spanish,	20	3
Beef, Turkish,	20	3
Beans, Boston baked,	60	12
Beans, Lima,	45	3
Beans, kidney,	90	6
Beans, string, green,	30	2
Cabbage, with bacon,	20	3
Cabbage, Bavarian,	20	3
Cabbage, with fresh pork,	45	3
Carrots, boiled,	20	3
Chicken, à la creole,	45	6
Chicken, curry of,	45	4
Chili con carne,	30	3
Codfish, creamed,	15	2
Ham, boiled,	45	4
Mutton, stew,	20	4
Parsnips,	30	3
Pork, fresh boiled,	60	4
Potatoes, Irish,	15	2
Potatoes, sweet,	20	2
Sauerkraut, with bacon or salt pork,	45	3
Succotash,	20	3
Tomatoes, stewed,	20	1
Turnips, boiled,	60	3

Note:—Meats should not be cooked in pieces weighing more than from three to five pounds.

SWINGING CAGE



Useful in garrison or permanent camp, but must be constructed at the expense of the company fund. It is about 3′ cube.

CHAPTER IX

HANDLING THE RATION IN THE FIELD

27. Although the ***field ration*** as such is no longer supplied, the following bills of fare are appropriate for a command on the march, and for this reason are retained.

It is noted that the noon meal is in the nature of a quickly prepared lunch, and supper is the heavy meal of the day.

The method for computing the cost of living explained for the garrison ration in paragraphs 11-13 inclusive, may be followed to advantage, or a daily inventory may be taken to ascertain whether there remains on hand each day a proper proportion of the various classes of articles issued to run the mess for the remaining days of the ration period; thus if four days remain of the ration period, the inventory will show whether or not four days' rations of meats, bread and flour, vegetables, coffee, sugar, etc., remain on hand, and it is one of the most important duties of the Mess Sergeant to so regulate the expenditures of supplies that they will satisfactorily cover the entire period for which they were drawn.

Attention is invited to paragraph 5, from which it is seen that the Reserve ration may be increased by the issue of such articles as may be necessary to provide the bills of fare as given. They were based on the field ration as formerly issued.

BILLS OF FARE FOR TEN DAYS BASED UPON COMPONENTS OF THE FIELD RATION AS FORMERLY ISSUED. (50 men).

1. BREAKFAST	
Fried bacon,	Bacon, 14 lbs.
Lyonnaise potatoes,	Potatoes, 20 lbs.; onions, 5 lbs.
Bread and sugar sirup,	Soft bread, 20 lbs.; sugar, 9 lbs.
Coffee (6 gallons),	Coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Bacon and beans with tomato sauce, (packed in fireless cooker the night before),	Bacon, 6 lbs.; beans, 12½ lbs.; tomatoes, 2 cans; sugar, 1 lb.; vinegar, 1 pint.
Bread,	Soft bread, 20 lbs.
SUPPER.	
Fried beefsteak and onions,	Beef, 25 lbs.; onions, 10 lbs.
Hot biscuits,	Flour, 13 lbs.; baking p'wd'r, 8 ozs.
Jam,	Jam, 8 cans.
Coffee,	Coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
2. BREAKFAST.	
Irish stew (fireless cooker),	Beef, 15 lbs.; potatoes, 10 lbs.; onions, 3 lbs.; tomatoes, 2 cans.
Bread,	Soft bread, 20 lbs.
Coffee,	Coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Cold canned corned beef,	Corned beef, 10 cans (2-lb. cans).
Bread and pickles,	Soft bread, 20 lbs.; pickles, 1 qt.
SUPPER.	
Tomato soup (6 gallons).	Tomatoes, 4 cans; beef bones.
Hard bread,	Hard bread, 10 lbs.
Roast beef and browned potatoes,	Beef, 25 lbs.; potatoes, 30 lbs.; onions, 2 lbs.; flour, 1 lb.
Steamed rice with sugar,	Rice, 4 lbs.; sugar, 4 lbs.
Hot tea (6 gallons).	Tea, 3 ozs.; sugar, 1½ lbs.
Bread,	Soft bread, 15 lbs.

Bills of Fare for Field—Continued

3. BREAKFAST	
Beefsteak and gravy,	Beef, 20 lbs.
Hot biscuits and sugar sirup,	Flour, 13 lbs.; baking powder, 8 ozs.; sugar (for sirup), 9½ lbs.
Coffee,	Coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Irish stew (fireless cooker),	Beef, 15 lbs.; potatoes, 10 lbs.; onions, 4 lbs.; tomatoes, 2 cans.
Bread and tea,	Soft bread, 20 lbs.; tea, 3 ozs.; sugar, 1½ lbs.
SUPPER.	
Soft roast beef and gravy,	Beef, 25 lbs.; onions, 2 lbs.; flour, 1 lb.
Boiled potatoes,	Potatoes, 25 lbs.
Sliced onions and pickles,	Onions, 5 lbs.; pickles, 1 pint; vinegar, 1 pint.
Blackberry roll, plain sauce,	Sugar, 6 lbs.; blackberry jam, 4 cans; milk, 1 can; flour, 6 lbs.
Bread and tea,	Soft bread, 20 lbs.; tea, 3 ozs.; sugar, 1½ lbs.
4. BREAKFAST.	
Steamed rice and sugar,	Rice, 6 lbs,; sugar, 5 lbs.
Hamburg steak and gravy,	Beef. 20 lbs.; onions, 5 lbs.
Baked potatoes,	Potatoes, 20 lbs.
Bread and coffee,	Soft bread, 15 lbs.; coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Cold canned corned beef,	Corned beef, 10 2-lb. cans.
Hard bread,	Hard bread, 15 lbs.
Sliced onions and pickles,	Onions, 3 lbs.; pickles, 1 pint; vinegar, 1 pint.
SUPPER.	
Bacon and beans (fireless cooker), tomato sauce,	Bacon, 7 lbs.; beans, 12½ lbs.; tomatoes, 2 cans; sugar, 2 lbs.; vinegar, 1 pint.
Hot biscuits and sugar sirup,	Flour, 12 lbs.; baking powder, 8 ozs.; sugar, 9 lbs.
Hot tea,	Tea, 3 ozs.; sugar, 1½ lbs.

BILLS OF FARE FOR FIELD—Continued

5. BREAKFAST.	
Beefsteak and onions,	Beef, 20 lbs.; onions, 10 lbs.; flour, 1 lb.
Potato sauté,	Potatoes, 20 lbs.
Bread and Coffee,	Soft bread, 15 lbs.; coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Cold fried bacon,	Bacon, 14 lbs.
Bread,	Soft bread, 20 lbs.
SUPPER.	
Bean soup (fireless cooker),	Bacon, 1 lb.; beans, 5 lbs.; beef bones.
Hard bread,	Hard bread, 10 lbs.
Roast beef and gravy,	Beef, 20 lbs.
Boiled potatoes,	Potatoes, 20 lbs.
Sliced onions and pickles,	Onions, 5 lbs.; pickles, 1 pint; vinegar, 1 pint.
Hot biscuits and sugar sirup,	Flour, 11 lbs.; baking powder, 8 ozs.; sugar, 10 lbs.
Hot tea,	Tea, 3 ozs.; sugar, 1½ lbs.
6. BREAKFAST.	
Braised beef and gravy,	Beef, 20 lbs.; onions, 2 lbs.; flour, 1 lb.
Bread and coffee,	Soft bread, 15 lbs.; coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Bacon and beans with tomato sauce, (fireless cooker),	Bacon, 5 lbs.; beans, 12½ lbs.; tomatoes, 2 cans; sugar, 1 lb.; vinegar, 1 pint.
Bread,	Soft bread, 20 lbs.
SUPPER.	
Beef à la mode,	Beef, 25 lbs.; bacon, 2 lbs.; pickles, 1 pint; vinegar, 1 pint; onions, 3 lbs.; flour, 1 lb.; tomatoes, 2 cans.
Boiled potatoes,	Potatoes, 25 lbs.
Hot biscuits,	Flour. 12 lbs.; baking powder, 8 ozs.
Hot tea,	Tea, 3 ozs.; sugar, 1½ lbs.

Bills of Fare for Field—Continued

7. BREAKFAST.	
Beefsteak and onions, gravy,	Beef, 25 lbs.; onions, 5 lbs.
Baked potatoes,	Potatoes, 20 lbs.
Bread and Coffee,	Soft bread, 20 lbs.; coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Boiled beef and potatoes, (fireless cooker),	Beef, 15 lbs.; potatoes, 15 lbs.; flour, 1 lb.
Hard bread,	Hard bread, 15 lbs.
Tea,	Tea, 3 ozs.; sugar, 1½ lbs.
SUPPER.	
Potato soup,	Potatoes, 10 lbs.; milk, 1 can; beef bones.
Hard bread,	Hard bread, 10 lbs.
Soft roast beef,	Beef, 20 lbs.
Boiled onions,	Onions, 15 lbs.
Sliced onions and pickles,	Onions, 3 lbs.; pickles, 1 pint; vinegar, 1 pint.
Hot biscuits,	Flour, 11 lbs.; baking p'wd'r, 8 ozs.
Jam,	Jam, 8 cans.
Coffee,	Coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
8. BREAKFAST.	
Fried bacon.	Bacon, 15 lbs.
Lyonnaise potatoes,	Potatoes, 20 lbs.; onions, 5 lbs.
Bread and coffee,	Soft bread, 20 lbs.; coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Corned beef hash,	Corned beef hash, 10 2-lb. cans.
Hard bread,	Hard bread, 15 lbs.
Tea,	Tea, 3 ozs.; sugar, 1½ lbs.
SUPPER.	
Bean soup (fireless cooker),	Bacon, 2 lbs.; beans, 5 lbs.; beef bones.
Hard bread,	Hard bread, 15 lbs.
Roast beef, browned gravy,	Beef, 25 lbs.
Browned potatoes,	Potatoes, 25 lbs.
Sliced onions and pickles,	Onions, 3 lbs.; pickles, 1 pint; vinegar, 1 pint.
Bread and tea,	Soft bread, 15 lbs.; tea, 3 ozs.; sugar, 1½ lbs.

BILLS OF FARE FOR FIELD—Continued

9. BREAKFAST.	
Corned beef hash,	Corned beef hash, 10 2-lb. cans.
German fried potatoes,	Potatoes, 20 lbs.; bacon, 1 lb.; milk, 1 can.
Hot biscuits and sugar sirup,	Flour, 14 lbs.; baking powder, 8 ozs.; sugar, 10 lbs.
Coffee,	Coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER.	
Bacon and beans (fireless cooker), tomato sauce,	Bacon, 6 lbs.; beans, 12½ lbs.; tomatoes, 2 cans; sugar, 1 lb.; vinegar, 1 pint.
Sliced onions and pickles,	Onions, 5 lbs.; pickles, 1 qt.
Bread and tea,	Soft bread, 15 lbs.; tea, 5 ozs.; sugar, 1½ lbs.
SUPPER.	
Tomato soup,	Tomatoes, 5 cans; bacon, 2 lbs.; beef bones.
Hard bread,	Hard bread, 10 lbs.
Roast beef and browned gravy,	Beef, 25 lbs.; flour, 2½ lbs.
Creamed potatoes,	Potatoes, 25 lbs.; milk, 1 can.
Bread and coffee,	Soft bread, 10 lbs.; Coffee, 30 ozs.; sugar, 1½ lbs.
10. BREAKFAST.	
Irish stew (fireless cooker),	Beef, 10 lbs.; potatoes, 10 lbs.; onions, 2 lbs.; tomatoes, 2 cans.
Hot biscuits and jam,	Flour, 12 lbs.; baking powder, 8 ozs.; jam, 8 cans.
Coffee,	Coffee, 30 ozs.; sugar, 1½ lbs.; milk, 1 can.
DINNER,	
Corned beef hash and canned corn beef,	Corned beef hash, 5 2-lb. cans; corned beef, 5 2-lb. cans.
Bread and coffee,	Bread, 17½ lbs.; coffee, 28 ozs.; sugar, 1½ lbs.
SUPPER.	
Beef soup (fireless cooker),	
Boiled beef and potatoes,	Beef, 25 lbs.; potatoes, 25 lbs.
Sliced onions,	Onions, 3 lbs.
Bread and coffee,	Soft bread, 20 lbs.; coffee, 30 ozs.; sugar, 1½ lbs.

Draw articles of ration for 10-day period as follows:	Beef, fresh	Bacon	Beef, corn'd, canned	Hash, corned beef	Flour	Bread, soft	Bread, hard	Baking powder	Beans	Rice	Potatoes	Onions	Tomatoes	Jam, blackberry	Coffee, R. & G.	Tea	Sugar	Milk	Vinegar	Pickles	Salt	Pepper
Days	6	2	1	1	2	6	2	2	8	2	7	2	1	10	8	2	10	10	5	5	10	10
UNITS	lbs.	lbs.	can	can	lbs.	lbs.	lbs.	ozs.	lbs.	lbs.	lbs.	lbs.	can	can	ozs.	ozs.	lbs.	can	qts.	qts.	lbs.	ozs.
1 Breakfast,		14				20					20	5			30		10½	1				
Dinner,		6				20			12½				2				1		½			
Supper,	25				13			8				10		8	30		1½	1				
2 Breakfast,	15					20					10	3	2		30		1½	1				
Dinner,			10			20														1		
Supper,	25				1	15	10			4	30	2	4			3	5½					
3 Breakfast,	20				13			8							30		11	1				
Dinner,	15					20					10	4	2			3	1½					
Supper,	25				7	20					25	7		4		3	7½	1	½	½		
4 Breakfast,	20					15				6	20	5			30		1½	1				
Dinner,			10				15					3							½	½		
Supper,		7			12			8	12½				2			3	12½		½			

5	Breakfast,	20				1	15					20	10			30		1½	1												
	Dinner,		14				20																								
	Supper,	20	1			11		10	8	5		20	5				3	11½		½	½										
6	Breakfast,	20				1	15						2			30		1½	1												
	Dinner,		5				20			12½				2				1		½											
	Supper,	25	2			13			8			25	3	2			3	1½		½	½										
7	Breakfast,	25					20					20	5			30		1½	1												
	Dinner,	15				1		15				15					3	1½													
	Supper,	20				11		10	8			10	18		8	30		1½	2	½	½										
8	Breakfast,		15				20					20	5			30		1½	1												
	Dinner,				10			15									3	1½													
	Supper,	25	2				15	15		5		25	3				3	1½		½	½										
9	Breakfast,		1		10	14			8			20				30		11½	2												
	Dinner,		6				15			12½			5	2			5	2½		½	1										
	Supper,	25	2			2½	10	10				25		5		30		1½	1												
10	Breakfast,	10				12			8			10	2	2	8	30		1½	1												
	Dinner,			5	5		17½									28		1½													
	Supper,	25					20					25	3			30		1½													
		375	75	25	25	112½	337½	100	64	60		10 350	100	25	28	448	32	100		16	5	5	20	20							

A FIELD MESS CHEST

Especially adapted for the use of troops on the march. It should be carried in the back end of an escort wagon and not removed when camp is reached. All of the smaller components of the ration required for daily use should be carried in the chest, which holds about 200 rations. All of the drawers should set in pigeon-holes so that the boxes shall be very firm, the drawers slide easily, and the components not shake out and mix. The lid sets closely against the front of the drawers and prevents leakage and consequent mixture of ingredients. When lowered, the lid serves as a table for moulding bread or for other kitchen use.

Dimensions: 3 feet 2 inches long, 2 feet 8 inches high and 2 feet 8 inches deep. Strong rope or "field desk" handles should be placed on sides. Constructed of pine and should weigh about 100 pounds.

CHAPTER X

FIELD EXPEDIENTS

28. It is intended that the field range shall be carried so long as wagon transportation is available. Thereafter, it may be carried on a pack mule, but if none is available, it will have to be abandoned, and the boilers and other utensils carried by the cooks. Ordinarily, thereafter, only boiling and frying can be done, unless clay ovens or dug-out ovens are constructed. To utilize the boilers to the best advantage, an iron rack may sometimes be quickly constructed from materials at hand. In good soil, however, a narrow trench for the fire is about the most satisfactory device that can be used. It should be of such width that the boilers may be set across it. If available, green trunks of trees (say about eight inches in diameter) may be laid parallel to each other at a suitable distance apart for supporting the boilers, the fire being built between them; or, similarly, rocks of suitable thickness may be arranged in a convenient manner for supporting the boilers above the fire to be built under them. If more time is available, an oven may be dug in a bank and vertical flues constructed, over which the boilers may be placed. After firing, the coals may be withdrawn and baking done in the same chamber; or, the dug-out may be used for baking and roasting only, and boiling otherwise provided for, so that all portions of the meal may be cooked at the same time. Attention is also invited to the open trench for baking; the clay oven above ground; and to the simple range made by covering a trench of suitable width with a bake-pan or two for a boiling surface, and utilizing two or more coffee cans set end-on, for a flue.

FIELD EXPEDIENT KITCHEN

1. Clay covered trench. 2. Open trench for baking. 3. Bean pit. 4. Ovens in hillside. 5. Mud oven. 6. Mud range. 7. Kitchen.

THE MUD FIELD RANGE

29. Lay out a level piece of ground about 3′ 10″ by 6′ 9″ and cover about three inches thick with wet clay; pack well and smooth on top. On the center of this floor lay the barrels end to end with the opening of one where the front of the range is to be. Take sand just damp enough to mold and pack under the sides of the barrels and over the top, making the form for the inside of the oven. With the clay make a thick mud and mix straw into it. This is very necessary, as the straw holds the clay together.

Begin on the sides and back and lay on the mud by hand, packing it well as it is laid on. Make bottom of sides about 10″ thick and top about 8″.

Just before the top is to be laid on, place blocks or bricks on end in center of top of each barrel and one over where the barrels join. Pack some of the clay around them to hold them in place while finishing the top.

If desired, a hole may be left at the back, and a mud chimney constructed. This improves the draft and is believed desirable, but is not necessary.

This oven should be allowed to stand in a dry atmosphere for at least 24 hours; then burn out the barrels with a slow fire. Keep a slow fire burning until the oven is well dried. The sand will then drop out and can be raked out with a hoe. Remove the bricks or blocks and the range is ready for use, but cracks appearing should be plastered up with mud. *Time required for four men to build;* about 4 hours.

When articles cooked on top of the range are done, the fire can be drawn and the oven used for baking bread or meats.

FIELD EXPEDIENT KITCHEN.

4. Dug-Out Oven. 5. Two-Barrel Mud Oven. 6. Two-Barrel Mud Range.

HOW TO CONSTRUCT AND OPERATE A TWO-BARREL CLAY OVEN

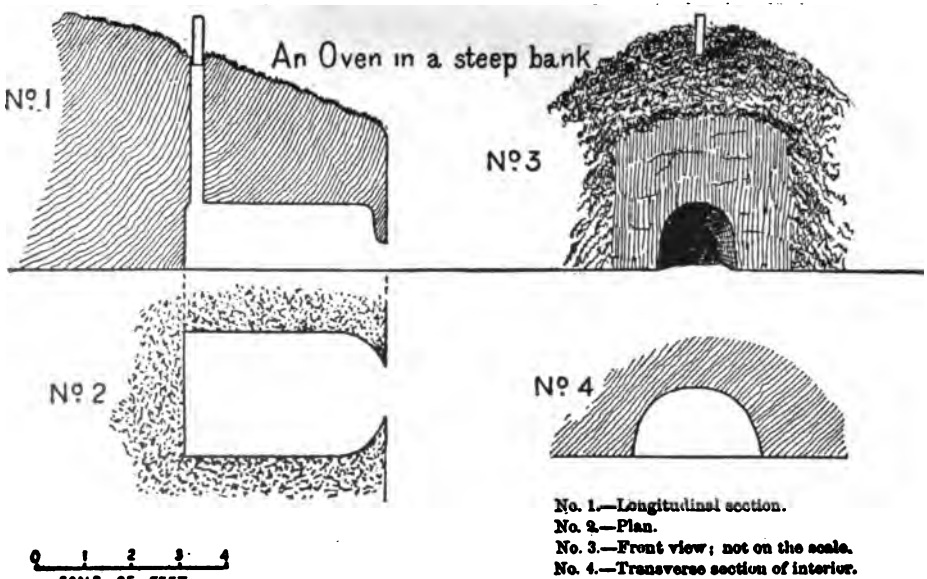
30. Select a piece of level ground about 4' by 10', get two salt or sugar barrels; knock top and bottom from one, and a small section of the bottom from the other (to be used as a flue in burning out); place them together head on, the one with the bottom in to the rear. Cover the ends coming together with a little hay, so as to keep the sand from falling in, and stuff up the hole broken in the bottom of the rear barrel. Get some moist sand and cover both barrels completely, moulding it so that it will be about two inches thick on top and splay out at the bottom about two inches on each side. Then mix some clay with hay, straw or grass until you have a pretty stiff mixture, and cover the sand, beginning at the bottom where it should be about eight inches thick and finishing at the top with about four inches. Let stand for a day or two and then add about three inches of clay to the entire oven. Allow to stand a day longer and then cut a hole at the rear, taking the hay from the bottom of the barrel. This will afford a draught and is also an excellent means of regulating the heat. Put a fire in the barrels and burn them out. Care should be taken to put in just enough fire to start the barrels, as a big fire will burn it too quickly, and the oven will cave in. After the barrels are burned out, scrape all the sand from the top and sides and throw it out. The oven is now complete.

To obtain the best results with this type of oven, it is best to start the fire as soon as the dough is set. Keep up a pretty brisk fire for about two hours, and as soon as the dough is punched down, spread the coals evenly throughout the entire oven, and close all draughts. As soon as the dough is panned, draw the fire and close the oven up for about half an hour. Then take the oven "count." If you can count seven (second counts) you have just the proper heat. If more than ten, the oven is useless. If less than seven, the oven

TWO-BARREL CLAY OVEN

is too hot. This oven will hold five pans, each 12" x 24", or 50 rations—sufficient for a company—and is equal in baking properties to any oven made. It will bake one batch of 50 rations per hour.

To make a second run, put in another fire for about half an hour, draw the fire and close the oven for fifteen minutes, and the oven will be ready for the second run. It would be well to dig a trench in front of the oven for convenience in handling the bread.



No. 1.—Longitudinal section.
No. 2.—Plan.
No. 3.—Front view; not on the scale.
No. 4.—Transverse section of interior.

Handled in exactly the same manner as the improvised two-barrel clay oven.

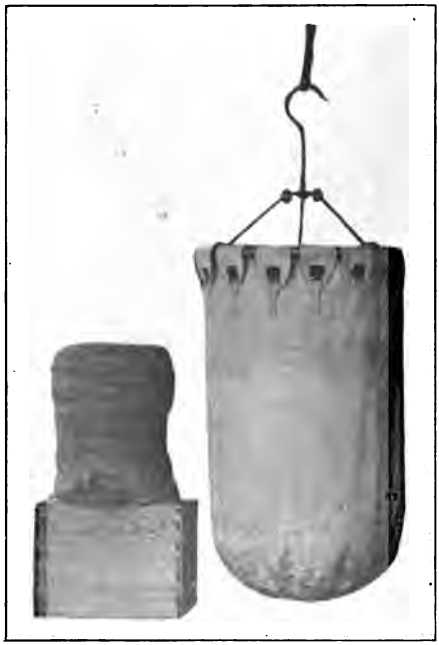
TYPE OF OVEN DUG IN THE SIDE OF A HILL OR PIT

Handled in exactly the same manner as the improvised 2-barrel clay oven. A flue is generally dug at the rear end, but this is not necessary. An oven suitable for 4 or 5

OPEN TRENCH USED FOR BAKING.

Trench about 6′ x 15″-12″ deep. Dry out by slow fire and keep slow fire in it about 2 hours before baking. Sweep trench clean and test temperature by sprinkling a little flour on bottom. It should brown in about 2 minutes. Place loaves, moulded dry, across trench and about 2 inches apart. Cover trench with a sheet of iron or zinc and place coals upon it. Regulate top heat as required. Vienna shaped single ration loaves recommended.

WATER COOLER



On the left is shown a ten gallon coffee boiler wrapped with wet gunny sacks.

On the right is a canvas bag containing fresh water.

In each case the water in the receptacle is kept cool by evaporation, and hence they should be placed in a draught if possible.

CHAPTER XI.

INDIVIDUAL COOKING

31. For such individual cooking as may be necessary for the soldier when thrown upon his own resources, the following Bills of Fare have been prepared. Where the tin cup and spoon are mentioned, reference is made to those issued with the field mess kit.

Remember that the best fire for cooking is a small, clear one, or better yet, a few brisk coals.

Almost anything that can be cooked at all can be prepared in the mess kit, though the variety is necessarily small and quantities limited on account of few utensils of small capacity. For the essential principles of cooking see Chapter III, Mess Officer's Assistant.

Table of Weights and Measures

32. The Ordnance tin cup holds about ⅞ of a quart, and is most convenient in determining the weights of the several components of the ration used in the field. By filling it level full of the several articles noted below, the weights there given were accurately determined.

1 Ordnance tin cup level full holds

1 pound of flour. 1½ pounds of pease.
1½pounds of beans. 1¼ pounds of hominy.
1½ pounds of rice. 1¼ pounds of corn meal.
10 ounces of coffee, roasted and ground.
6 ounces of tea, English breakfast.
7 ounces of tea, Oolong.
10 ounces of tea, Young Hyson.
1½ pounds of sugar, granulated.
2 pounds of salt issue.

Company commanders in estimating the amounts that will be required for each meal may assume that one man will consume for one meal about

1 ounce of sugar.
½ ounce of coffee, 1 ounce chocolate or cocoa, or 1-10 ounce of tea.
4 ounces of dried vegetables.
4 ounces of flour or 4 hardtacks.
8 ounces of fresh vegetables.
4 ounces of sliced bacon or 6 to 8 ounces of fresh meat.
1-5 ounce of salt. 1-50 ounce of pepper.

1	Bacon	Boiled Rice	Flap Jack	Coffee
2	Meat and vegetable stew		Flap Jack	Coffee
3	Broiled Steak.	Fried Potatoes and Onions	Hard Bread	Cocoa
4	Bacon	Stewed Tomatoes	Hoe Cake	Coffee
5	Bacon	Oatmeal	Hard Bread	Tea
6	Bacon	Baked Potatoes, Rice	Flap Jack	Chocolate
7	Fried Steak	Boiled Potatoes Cold Tomatoes	Hard Bread	Coffee
	Etc.	Etc.	Etc.	Etc.

Or

WHEN TIME IS MORE LIMITED

8	Fried Bacon	Fried Potatoes	Hard Bread	Coffee
9	Fried Bacon	Flap Jack		Coffee
10	Corned Beef (cold)	Tomato Stew	Hard Bread	Coffee
11	Fried Fish and Bacon	Baked Potatoes	Hard Bread	Coffee
12	Meat and Vegetable Stew	Baked Potatoes	Hoe Cake	Tea
13	Broiled Steak		Hard Bread	Cocoa
14	Boiled Fish	Fried Potatoes	Hard Bread	Tea
	Etc.	Etc.	Etc.	Etc.

34 SUGGESTIONS FOR HANDLING BILL OF FARE No. 1

a. Take two-thirds of a cup of water and bring to a boil. Add four spoonfuls of rice and boil until soft, i. e., until it can be mashed by the fingers with but little resistance. This will require about 15 minutes. Add two pinches of salt and, after stirring, pour off the water and empty the rice out on the lid of the mess pan.

b. Meanwhile, fry three slices of bacon until slightly browned in the mess pan over a brisk fire or hot coals, and lay them on top of the rice, leaving sufficient grease in the pan in which to fry the flap jack.

c Take six spoonfuls of flour and one-third spoonful of baking powder and mix thoroughly. Add sufficient cold water to make a batter that will drip freely from the spoon. Add a pinch of salt and two pinches of sugar and pour the batter into the mess pan, which should contain the grease from the fried bacon. Place over medium hot coals and bake from five to seven minutes; see that it will slip easily in the pan and then, by a quick toss, turn it over and continue the baking from five to seven minutes longer or until, by examination, it is found to be done.

d. While the batter is frying, wash out the tin cup; two-thirds fill with water and let come to a boil. Add one medium heaping spoonful of coffee and stir well and, if desired, one spoonful of sugar and let boil for about five minutes. Let simmer for about ten minutes longer. Settle by a dash of cold water or let stand a few minutes.

A hot meal is now ready to serve. Time about 40 minutes.

RECIPES.

DRINKS.

(For one meal for one man)

Article & Amount	Amount of Water.	Add When	Let Boil.	Add if Desired.	Remarks.
COFFEE 1 hpg. spn.	2-3 cup	Water boils.	5 min.	1 spn. sug.	Stir grains well when adding. Let simmer 10 minutes after boiling. Settle with a dash of cold water or let stand a few minutes. Ready to serve.
COCOA 1 hpg. spn.	"	"	"	1½ " "	Stir when adding until dissolved. Ready to serve when sufficiently cooled.
CHOCOLATE 1 cu. in.	"	"	"	" " "	Stir when adding until dissolved. Ready to serve when sufficiently cooled.
TEA ½ lev. spn.	"	"		1 " "	Let stand or "draw" eight minutes. If allowed to stand longer, the tea will get bitter unless separated from the leaves.

NOTE: **COFFEE** made by above recipe is of medium strength and the same as when using four ounces to the gallon of water. It is within the limit of the ration if made but twice each day.

TEA. A little more than medium strength, the same as when using 3-5 ounce to the gallon, and within the ration allowance if made three times per day.

CHOCOLATE and COCOA. About one ounce per man per meal. If available, milk should be used in the place of water, and should be kept somewhat below the boiling point. Mix a one pound can of evaporated milk with 3½ quarts of water to make one gallon of milk of the proper consistency for use in making cocoa or chocolate.

DRIED VEGETABLES

(For one meal for one man)

Article & Amount	Amount of Water.	Add When.	Let Boil.	Season With	Add if Desired.	Remarks.
RICE 4 hpg. spns.	2-3 cup	Water boils	20 mins.	2 pinches salt	1 hpg. spn. sug.	Should be boiled until grains (while still nicely separated) may be crushed between the fingers with but little resistance. Then drain off the water.
CORNMEAL **HOMINY, FINE** **OATMEAL** 4 hpg. spns.	1-3 "	"	"	"		All water should now be taken up by the Cornmeal, Hominy or Oatmeal which forms a thick paste.
DRIED SW. CORN 4 hpg. spns.	1-3 "	"	"	"	"	
LIMA BEANS 4 hpg. spns.	2-3 "	Water is put on	2 or 3 hrs.	1 "		When done the beans should still be whole but soft. Add one small slice of bacon one-half hour before done. Add water as required.
CHILI BEANS **FRIJOLES** 4 hpg. spns.	2-3 cup	"	3 or 4 hrs.	1 "		Above remark applies.
BEANS, ISSUE DRIED GR. PEASE HOMINY, COARSE SPLIT PEASE 4 hpg. spns.	"	"	"	"		Not recommended on account of time required for cooking.

NOTE: By a heaping spoonful is meant here all that can readily be taken up.

A pinch of salt is the amount that can readily be taken up between the end of the thumb and forefinger.

36 MEATS

Bacon. Cut side of bacon in half lengthwise. Then cut slices about five to the inch, three of which should generally be sufficient for one man for one meal. Place in a mess pan with about one-half inch of cold water. Let come to a boil and then pour the water off. Fry over a brisk fire, turning the bacon once and quickly browning it. Remove the bacon to lid of mess pan, leaving the grease for frying potatoes, onions, rice flap jacks, etc., according to recipe.

Fresh Meat—*To fry.* To fry, a small amount of grease (1 to 2 spoonfuls) is necessary. Put grease in mess pan and let come to a smoking temperature, then drop in the steak, and, if about one-half inch thick, let fry for about one minute before turning—depending upon whether it is desired it shall be rare, medium or well done. Then turn and fry briskly as before. Salt and pepper to taste.

Applies to beef, veal, pork, mutton, venison, etc.

Fresh Meat—*To broil.* Cut in slices about one inch thick, from half as large as the hand to four times that size. Sharpen a stick or branch of convenient length—say from two to four feet long and weave the point of the stick through the steak several times so that it may be readily turned over a few brisk coals or on the windward side of a small fire. Allow to brown nicely, turning frequently. Salt and pepper to taste. Meat with considerable fat is preferred, though any meat may be broiled in this manner.

Fresh Meat—*To stew.* Cut into chunks from one-half inch to one inch cube. Fill cup about one-third

full of meat and cover with about one inch of water. Let boil or simmer about one hour or until tender. Add such fibrous vegetables as carrots, turnips or cabbage, cut into small chunks, soon after the meat is put on to boil, and potatoes, onions, or rather tender vegetables when the meat is about half done. Amount of vegetables to be added, about the same as meat, depending upon supply and taste. Salt and pepper to taste. Applies to all fresh meats and fowls. The proportion of meat and vegetables used varies with their abundance and fixed quantities cannot be adhered to. Fresh fish can be handled as above, except that it is cooked much quicker, and potatoes, onions, and canned corn are the only vegetables generally used with it, thus making a chowder. A slice of bacon would greatly improve the flavor. May be conveniently cooked in mess pan or tin cup.

37 FRESH VEGETABLES

Potatoes. Fried. Take two medium sized potatoes or one large one (about one-half pound), peel and cut into slices about one-fourth inch thick and scatter well in the mess pan in which the grease remains after frying the bacon. Add sufficient water to half cover the potatoes, cover with the lid to keep the moisture in, and let come to a boil from 15 to 20 minutes. Remove the cover and dry as desired. Salt and pepper to taste. During the cooking the bacon already prepared may be kept on the cover, which is most conveniently placed bottom side up over the cooking vegetables.

Onions, Fried. Same as potatoes.

Potatoes, Boiled. Peel two medium sized potatoes or one large one (about one-half pound), and cut in coarse chunks of about the same size—say one and one-half inch cubes. Place in mess pan and three-fourths fill with water. Cover with lid and let boil or simmer for 15 or 20 minutes. They are done when easily penetrated with a sharp stick. Pour off the water and let dry out for one or two minutes over hot ashes or light coals.

Potatoes, Baked. Take two medium sized potatoes or one large one cut in half (about one-half pound). Lay in bed of light coals, cover with same and smother with ashes. Do not disturb for 30 or 40 minutes, when they should be done.

Canned Tomatoes. One two-pound can is generally sufficient for five men.

Stew. Pour into the mess pan one man's allowance of tomatoes, add about two large hardtacks broken into small pieces and let come to a boil. Add salt and pepper to taste, or add a pinch of salt and one-fourth spoonful of sugar.

Or, having fried the bacon, pour the tomatoes into the mess pan, the grease remaining, and add if desired, two broken hardtacks. Set over a brisk fire and let come to a boil.

Or, heat the tomatoes just as they come from the can, adding two pinches of salt and one-half spoonful of sugar if desired.

Or, especially in hot weather, eaten cold with hard bread they are very palatable.

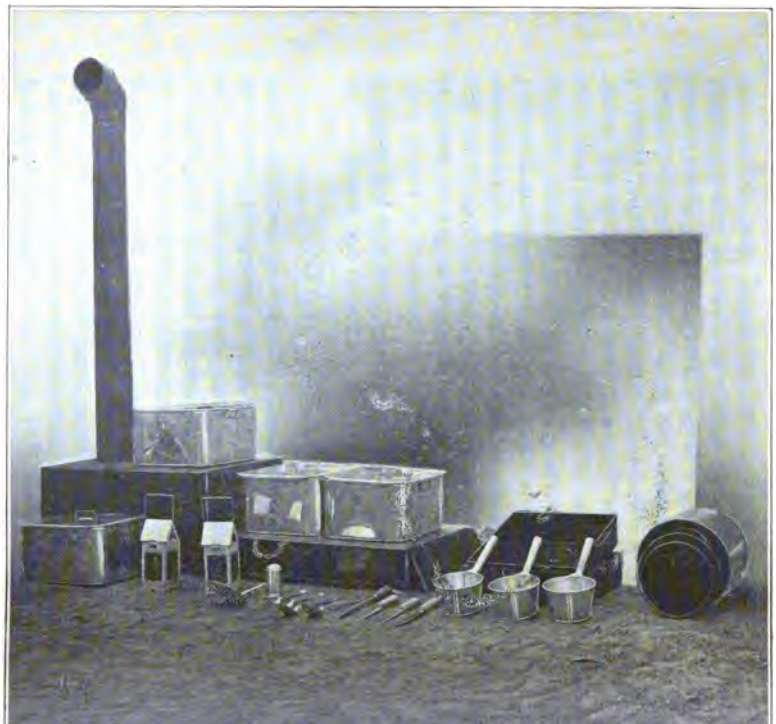
38 HOT BREADS

Flap Jack. Take six spoonfuls of flour and one-third spoonful of baking powder and mix thoroughly (or dry mix in a large pan before issue, at the rate of 25 pounds of flour and three half pound cans of baking powder for 100 men). Add sufficient cold water to make a batter that will drip freely from the spoon, adding a pinch of salt. Pour into the mess pan, which should contain the grease from fried bacon, or a spoonful of butter or fat, and place over medium hot coals, sufficient to bake so that in from five to seven minutes, the flap jack may be turned by a quick toss of the pan. Fry from five to seven minutes longer or until, by examination, it is found to be done.

Hoe Cake. Hoe cake is made exactly the same as a flap jack by substituting *corn meal* for *flour*.

39 EMERGENCY RATION

Emergency Rations. Detailed instructions as to the manner of preparing the emergency ration are found on the label with each can. Remember that even a very limited amount of bacon or hard bread, or both, taken with the emergency ration makes it far more palatable, and greatly extends the period during which it can be consumed with relish. For this reason it would be better to husband the supply of hard bread and bacon to use with the emergency ration when it becomes evident that the latter must be consumed, rather than to retain the emergency ration to the last extremity to be used exclusively for a longer period than two or three days.



CHAPTER XII.

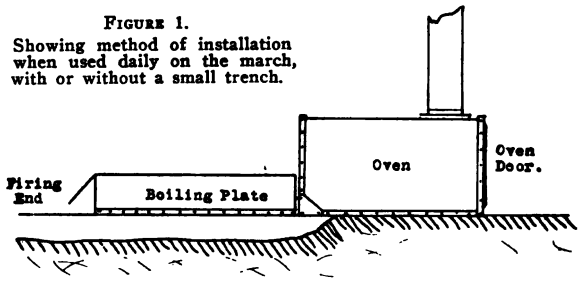
INSTRUCTIONS FOR INSTALLING AND OPERATING ARMY FIELD RANGES NOS. 1 AND 2 AND BATTALION INCINERATOR.

40. *The Army Field Range No. 1,* complete, weighs approximately 210 pounds, with utensils, and is designed to cook for 111 men. It consists essentially of two parts, the *oven* and the *boiling plate.* For transportation, the boiling plate is placed on the top of the oven, and the utensils (with flue) packed within the oven chamber.

On the march the range is set up ordinarily—from day to day—by simply leveling the ground to be covered by it, removing the boiling plate and placing it in the position shown—the projecting collar being slipped into the space cut from one end of the oven for that purpose. The oven should not be banked, as this would soon cause the sheet iron along the sides to warp, and finally burn through. Just enough earth should be tamped along the sides and closed end to prevent the passage of gases beneath. This earth should not extend above the straps along the sides and under the oven door.

It is unnecessary in this case to dig a trench, but if a few shovelfuls of earth are removed from the space to be covered by the boiling plate, it will facilitate firing. The best results are obtained when using short wood, keeping the fire well toward the firing end of the boiling plate; or, if using long sticks and branches, pushing them under the boiling plate (never under the oven) as they are consumed. (See Figure 1.)

FIGURE 1.
Showing method of installation when used daily on the march, with or without a small trench.



If the range is to remain in place for several days, it is best to dig a trench (except in sandy soil) about sixteen inches wide by ten inches deep, and of sufficient length for free service, say four feet. When installed, the trench should extend under the boiling plate and about six inches under the oven—just enough to prevent choking of the draught. If the flame is allowed to play freely on the bottom of the oven chamber, it will become too hot for baking and the bottom of the oven will burn out prematurely. (See Figure 2.)

If a permanent camp is made, it is frequently necessary to evaporate the waste water under the range, and to consume the garbage by the same fire. In this case, dig a pit about six feet long, two feet wide, and four feet deep (generally speaking, the larger the better, in order to give a large reservoir for waste water); fill the pit with cobble stones, making large cavities, and leaving a fire box as suggested for temporary installation. Place a length of stove pipe, or any kind of chute, at a convenient place anywhere along the side of

FIGURE 2.
Showing method of installation when installed for several days at a time.

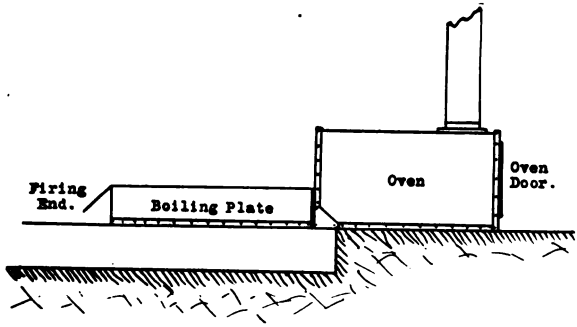
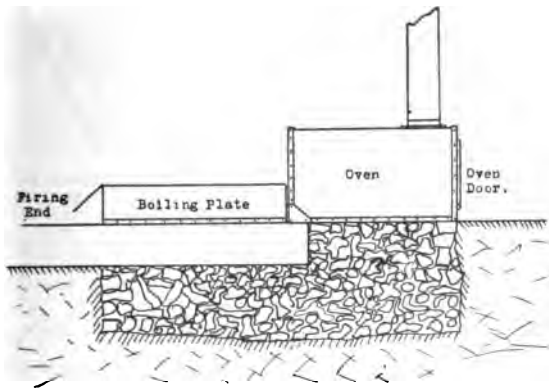
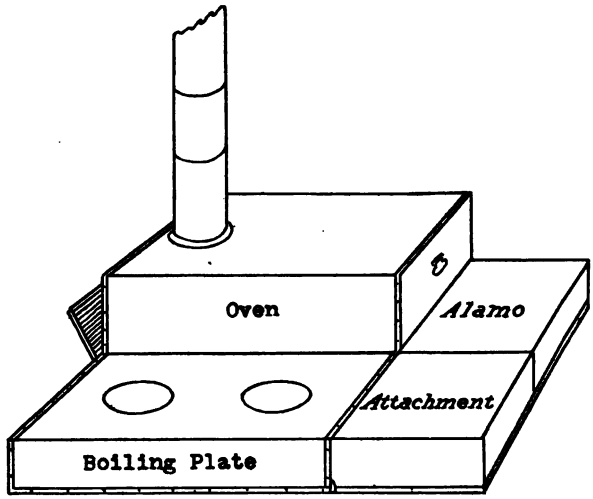


FIGURE 3.
Showing method of installation when waste water and garbage are disposed of by the range.



THE ALAMO ATTACHMENT



The "Alamo Attachment" (in 2 pieces) was introduced by Captain Oscar J. Charles, U. S. Inf. Its purpose is to reduce the heat on the bottom of the baking chamber, and increase the available boiling surface of the range.

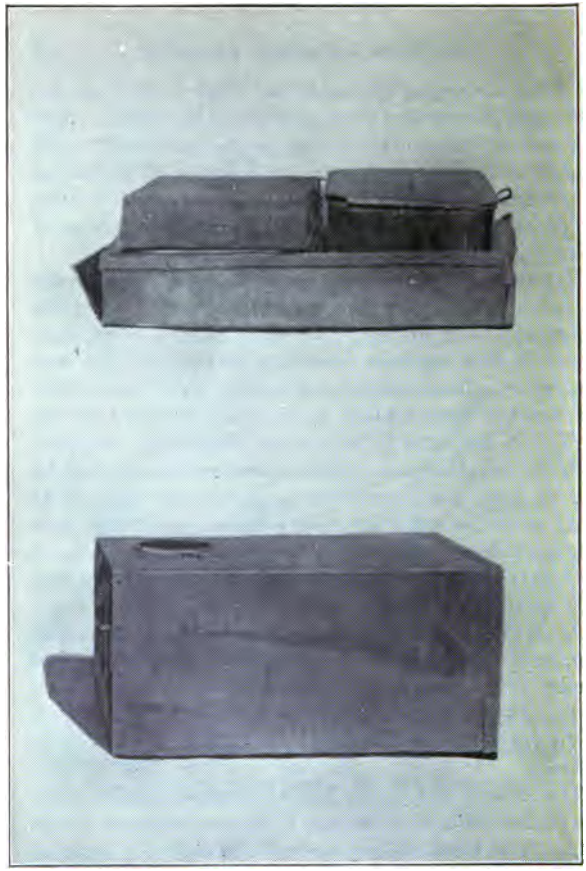
If used regularly it will double the life of the oven proper.

the oven, arranging the rocks on which it rests so that there will always be a free passage for the water. Pour in the waste water as it accumulates, retaining all solid matter by a wire screen, the solid matter to be burned in the trench under the boiling plate a little at a time, or perhaps better, after the meal has been prepared. (See Figure 3.)

Remarks on handling the range. It will be noted that the oven is generally too hot on the bottom after the range has been installed for more than two or three days. It then becomes necessary to keep the fire well toward the firing end of the boiling plate, or to raise the articles being cooked in the oven chamber off the bottom of the same by the use of angle irons (supplied with the latest issue), or by a boiler cover, inverted pie tin, or bake pan, according to circumstances. Earth must never be used for this purpose, as it will soon cause a hole to be burned in the bottom of the oven. A little care and good judgment only is necessary to procure satisfactory results.

Articles brought to a boil on the boiling plate will continue to simmer if set on top of the oven, or if placed close against the side of the oven or boiling plate. In this manner, a boiled dinner has been provided for an entire battalion, by adding the necessary utensils.

The Army Field Range No. 2, complete, weighs about 150 pounds, with utensils, and is designed to cook for 50 men. It is installed and operated exactly the same as the No. 1 range, reducing the length of the trench, when used, by one-half, as the parts of the No. 2 range are just half as long as the corresponding parts of the No. 1, although of the same width.



No. 1. TRENCH COVER AND ALL UTENSILS LAID OUT FOR SHIPMENT; WEIGHT WHEN MANTIED, 111 LBS.

No. 2. OVEN ALONE. WEIGHT, WHEN MANTIED, 117 LBS.

41. *To cover with Mantas and Pack on Mule.* Lay trench cover on the ground, back down, and pack all the utensils between the flanges, as shown in illustration No. 1. This, when mantied up in the ordinary manner, will make a neat package weighing about 111 pounds. The oven when mantied, constitutes the second package, weighing about 117 pounds.

For this purpose secure a pack cover and lair rope, spread out pack cover on ground and place range diagonally in center of cover—i. e., with ends facing opposite corners.

Face a side of the pack (range), pick up the near corner of cover and bring it tightly over range, spreading cover over top of range. Place knees on this part and reach for opposite corner of pack cover, bring it tightly over range, spreading cover over top of range.

Place either knee to hold cover in place and face one end, smooth canvas squarely down and turn in corners; reach out and grasp the end and bring it tightly over range, spreading canvas out if necessary to cover corners.

Place either knee thereon, face opposite end and do likewise. Place the hand or knee on top of range to hold cover in place and reach for lair rope; bring the rope crosswise under pack (range) holding the eye of rope near the center at top of range. Place the end of lair rope through eye, if not already there, and draw it through; grasp the running rope in both hands (the running rope is that portion extending from the eye); now place both knees on side of pack or range, and

REAR VIEW OF FIELD RANGE PREPARED FOR PACK TRANSPORTATION.

OVEN PROPER ON NEAR SIDE; TRENCH COVER, WITH UTENSILS ON OFF SIDE.

draw well taut. This should bring the eye of rope near to center and from 6 to 8 inches from end of pack or range. Hold slack with left hand, grasp the rope with right in advance of the left and raise the side of the range—i. e., lean it over on opposite and bottom edge—so as to give opportunity to pass the rope under the pack; in doing so keep the rope on center of end and along the center of bottom side of pack; now hold the running rope, stand erect, and place the foot or knees on end of pack, and draw the rope taut. Hold slack with left hand, grasp the rope with the right in advance of the left, and form a loop outward and inward, so that the right hand will come under the left and the running part of the rope will ride under the standing part. Face this end and bring this loop under the pack about 6 or 8 inches from the end, face the side of pack and draw taut.

Now pass the end of rope under the rope at center of opposite end of pack and draw in all slack; place the foot or knees on end of pack and draw taut; now face the opposite end and do likewise, and secure the end of rope at the intersection of cross ropes. Should there be sufficient rope a loop may be taken at the center of pack and finish as before.

Note. The operation of lairing up a side pack (field range) is similar to that performed by the grocer or druggist in doing up any ordinary package, with the exception that the rope has an eye provided on one end in order to secure the wrapping of side pack more firmly.

The average enlisted man will readily learn how to raise the pack on edge to pass the rope with freedom in the formation of lairing up the pack.

In all box loads the loop of rope is brought across the end; with sack loads the loop is brought along the center and side of packs.

Pack on mule as illustrated and an easy-riding, well-balanced load results.

42. The following is the present authorized equipment of the Army field range No 1:

Boilers	6
Dippers, half-gallon	1
Dippers, quart	1
Cleavers, 6 inch	1
Forks, small	2
Grinders, meat	1
Guards, tent	1
Knives, butcher, 8 inch	3
Lanterns, folding	2
Pans, bake	2
Pipe, smoke, elbow	1
Pipe, smoke, joints	4
Saws, meat	1
Sharpeners, knife	1
Skimmers, large	1
Spoons, large	2

43. The following is the present authorized equipment of the Army field range, No. 2:

Boilers	2
Dippers, half-gallon	1
Forks, small	2
Guards, tent	1
Knives, butcher, 8 inch	2
Lanterns, folding	1
Pans, bake	2
Pipe, smoke, elbow	1
Pipe, smoke, joints	4

Saws, meat	1
Skimmers, small	1
Spoons, small	2
Sharpeners, knife	1

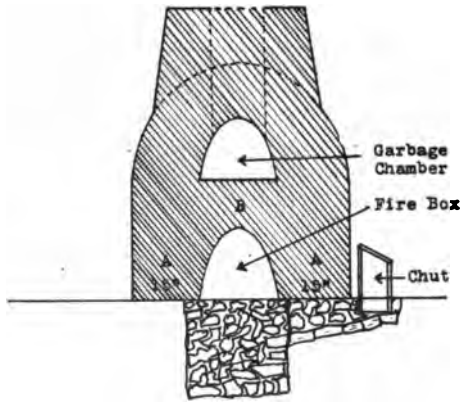
THE BATTALION INCINERATOR.

44. The disposal of all garbage and waste water is now recognized as a sanitary measure that cannot be safely overlooked by any organization commander. The garbage accumulating in the company kitchen can generally be disposed of in the new company field range, as explained in paragraph 40, but when an excessive amount must be consumed, as when melons, cabbage, green corn, etc., are used in quantity, other means must be provided. Such refuse may be burned in an open pit, or rock incinerator, but the amount of fuel thus consumed is excessive. Economy requires that a closed incinerator be constructed and the one illustrated is but one of several on the same general plan that have been found to be thoroughly satisfactory. The amount of fuel required is exceedingly small, the dangers incident to an open fire are obviated, and refuse is disposed of in the most expeditious manner.

CONSTRUCTION. Dig a pit about four feet deep, two feet wide, and as long as the incinerator—generally speaking the larger the better, in order to get a large reservoir for water. Fill the pit with cobble stones, as shown, and for convenience in disposing of waste matter, put in a chute through which the water may be conducted directly to the rock reservoir, being sure to leave an open passage for the free flow of the same. Lay three barrels end-on, or build a form of the general

THE DUNNE INCINERATOR.

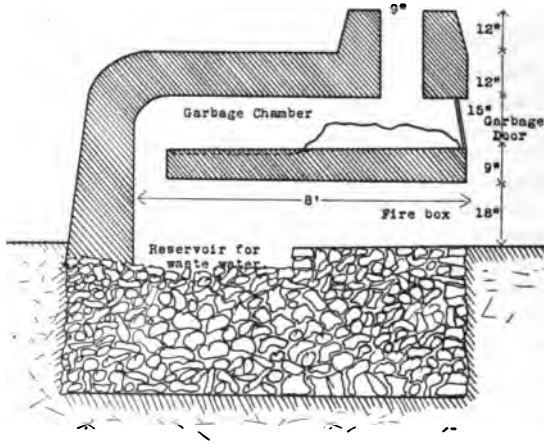
(Capacity sufficient for one battalion)
Cross section through chimney.



shape of the fire box, covering over with damp sand to secure just the form desired; make a stiff clay into which a little straw (and baling wire, if on hand) is worked. Pack the clay around the form, making the walls (A) and bench (B) of the dimensions given. Let this stand for two or three days, sheltered from the direct rays of the sun. Then construct a suitable form, or place barrels for the garbage chamber, and finish the construction. Let dry out for three or four days longer, if practicable, filling the cracks from day to day, as they appear, with soft mud; and to give a finer appearance, wash the incinerator from time to time with a broom and pail of water, thus filling up all small cracks,

THE DUNNE INCINERATOR.

(Capacity sufficient for one battalion)
Longitudinal Section.



and giving a smooth, regular surface. Burn out the oven by a very slow fire. If the oven should be burned out before the clay has had time to set, it would fall in. Construct a suitable door to close the refuse chamber; if of wood, cover the inner side with tin or sheet iron, or, if a good piece of sheet iron is available, simply hang it so as to cover the opening into the garbage chamber. Sometimes the incinerator is constructed without a chimney at all, in which case the door feature is omitted entirely.

OPERATION. During the day the garbage is thrown into the garbage chamber, the water draining

toward the rear, as the bench on which the garbage is thrown is inclined in that direction, and accumulates in the little reservoir indicated, flowing over into the reservoir below, from which it quickly evaporates by the heat of the fire.

After the refuse for the day has accumulated, build a fire in the fire box, using three or four sticks of cord wood, depending upon the amount of work to be done. It is noted that the fire passes over the surface of the water and garbage, carrying off the moisture and finally burning the garbage, which may, if desired, cover the entire shelf, leaving only sufficient flue space for a good draught, but the garbage should be stirred occasionally while being burned.

After the garbage has been consumed, rake out the ashes and close the door so as to retain the heat, which is sufficiently intense to prevent the flies from entering the garbage chamber throughout the greater portion of the following day.

CHAPTER XIII

SHORT-CUT MULTIPLICATION TABLE

45. It is often desired to compute the approximate cost of stores before actually making purchases at the Commissary or elswhere, and for this purpose the following table has been prepared. By reference to the table the approximate cost of any article, varying in quantity from one to one hundred units, and in price from one-half cent to thirty cents by halves, may be ascertained at a glance. For quantities greater than one hundred the cost of one hundred units should be multiplied by the number of hundreds desired.

Example: Assume that an organization wishes to buy 250 lbs. of flour, and the price is 2.5c per pound;

100 x 2.5c x 2	$5.00
50 x 2.5c	1.25
	$6.25

SHORT-CUT MULTIPLICATION TABLE

No.	$.005	$.01	$.015	$.02	$.025	$.03	$.035	$.04	$.045	$.05
.5		.01	.01	.01	.01	.02	.02	.02	.02	.03
1.0	.01	.01	.02	.02	.03	.03	.04	.04	.05	.05
1.5	.01	.02	.02	.03	.04	.05	.05	.06	.07	.08
2.0	.01	.02	.03	.04	.05	.06	.07	.08	.09	.10
2.5	.01	.03	.04	.05	.06	.08	.09	.10	.11	.13
3.0	.02	.03	.05	.06	.08	.09	11	.12	.14	.15
3.5	.02	.04	.05	.07	.09	.11	.13	.14	.16	.18
4.0	.02	.04	.06	.08	.10	.12	.14	.16	.18	.20
4.5	.02	.05	.07	.09	.11	.14	.16	.18	.20	.23
5.0	.03	.05	.08	.10	.13	.15	.18	.20	.23	.25
5.5	.03	.06	.08	.11	.14	.17	.19	.22	.25	.27
6.0	.03	.06	.09	.12	.15	.18	.21	.24	.27	.30
6.5	.03	.07	.10	.13	.16	.20	.23	.26	.29	.33
7.0	.04	.07	.11	.14	.18	.21	.25	.28	.32	.35
7.5	.04	.08	.11	.15	.19	.23	.26	.30	.34	.38
8.0	.04	.08	.12	.16	.20	.24	.28	.32	.36	.40
8.5	.04	.09	.13	.17	.21	.26	.30	.34	.38	.43
9.0	.05	.09	.14	.18	.23	.27	.32	.36	.41	.45
9.5	.05	.10	.14	.19	.24	.29	.33	.38	.43	.48
10.0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50
20.0	.10	.20	.30	.40	.50	.60	.70	.80	.90	1.00
30.0	.15	.30	.45	.60	.75	.90	1.05	1.20	1.35	1.50
40.0	.20	.40	.60	.80	1.00	1.20	1.40	1.60	1.80	2.00
50.0	.25	.50	.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
60.0	.30	.60	.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00
70.0	.35	.70	1.05	1.40	1.75	2.10	2.45	2.80	3.15	3.50
80.0	.40	.80	1.20	1.60	2.00	2.40	2.80	3.20	3.60	4.00
90.0	.45	.90	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50
100.0	.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00

No.	$.055	$.06	$.065	$.07	$.075	$.08	$.085	$.09	$.095	$.10
.5	.03	.03	.03	.04	.04	.04	.04	.05	.05	.05
1.0	.06	.06	.07	.07	.08	.08	.09	.09	.10	.10
1.5	.08	.09	.10	.11	.11	.12	.13	.14	.14	.15
2.0	.11	.12	.13	.14	.15	.16	.17	.18	.19	.20
2.5	.14	.15	.16	.18	.19	.20	.21	.23	.24	.25
3.0	.17	.18	.20	.21	.23	.24	.26	.27	.29	.30
3.5	.19	.21	.23	.25	.26	.28	.30	.32	.33	.35
4.0	.22	.24	.26	.28	.30	.32	.34	.36	.38	.40
4.5	.25	.27	.29	.32	.34	.36	.38	.41	.43	.45
5.0	.28	.30	.33	.35	.38	.40	.43	.45	.48	.50
5.5	.30	.33	.36	.39	.41	.44	.47	.50	.52	.55
6.0	.33	.36	.39	.42	.45	.48	.51	.54	.57	.60
6.5	.35	.39	.42	.46	.49	.52	.55	.59	.61	.65
7.0	.38	.42	.46	.49	.52	.56	.60	.63	.67	.70
7.5	.41	.45	.48	.53	.56	.60	.64	.68	.71	.75
8.0	.44	.48	.52	.56	.60	.64	.68	.72	.76	.80
8.5	.47	.51	.55	.60	.64	.68	.72	.77	.81	.85
9.0	.50	.54	.59	.63	.68	.72	.77	.81	.85	.90
9.5	.52	.57	.61	.67	.71	.76	.81	.86	.90	.95
10.0	.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00
20.0	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00
30.0	1.65	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	3.00
40.0	2.20	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.80	4.00
50.0	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75	5.00
60.0	3.30	3.60	3.90	4.20	4.50	4.80	5.10	5.40	5.70	6.00
70.0	3.85	4.20	4.55	4.90	5.25	5.60	5.95	6.30	6.65	7.00
80.0	4.40	4.80	5.20	5.60	6.00	6.40	6.80	7.20	7.60	8.00
90.0	4.95	5.40	5.85	6.30	6.75	7.20	7.65	8.10	8.55	9.00
100.0	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00

No.	$.105	$.11	$.115	$.12	$.125	$.13	$.135	$.14	$.145	$.15
.5	.05	.06	.06	.06	.06	.07	.07	.07	.07	.08
1.0	.11	.11	.12	.12	.13	.13	.14	.14	.15	.15
1.5	.16	.17	.17	.18	.19	.20	.20	.21	.22	.23
2.0	.21	.22	.23	.24	.25	.26	.27	.28	.29	.30
2.5	.26	.28	.29	.30	.31	.33	.34	.35	.36	.38
3.0	.32	.33	.35	.36	.38	.39	.41	.42	.44	.45
3.5	.37	.39	.40	.42	.44	.46	.47	.49	.51	.53
4.0	.42	.44	.46	.48	.50	.52	.54	.56	.58	.60
4.5	.47	.50	.52	.54	.56	.59	.61	.63	.65	.68
5.0	.53	.55	.58	.60	.63	.65	.68	.70	.73	.75
5.5	.58	.61	.64	.66	.69	.72	.74	.77	.80	.83
6.0	.63	.66	.69	.72	.75	.78	.81	.84	.87	.90
6.5	.68	.72	.75	.78	.81	.85	.88	.91	.94	.98
7.0	.74	.77	.81	.84	.88	.91	.95	.98	1.02	1.05
7.5	.79	.83	.87	.90	.94	.98	1.01	1.05	1.09	1.13
8.0	.84	.88	.92	.96	1.00	1.04	1.08	1.12	1.16	1.20
8.5	.89	.94	.98	1.02	1.06	1.11	1.15	1.19	1.23	1.28
9.0	.95	.99	1.04	1.08	1.13	1.17	1.22	1.26	1.31	1.35
9.5	1.00	1.05	1.10	1.14	1.19	1.24	1.28	1.33	1.38	1.43
10.0	1.05	1.10	1.15	1.20	1.25	1.30	1.35	1.40	1.45	1.50
20.0	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	3.00
30.0	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35	4.50
40.0	4.20	4.40	4.60	4.80	5.00	5.20	5.40	5.60	5.80	6.00
50.0	5.25	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50
60.0	6.30	6.60	6.90	7.20	7.50	7.80	8.10	8.40	8.70	9.00
70.0	7.35	7.70	8.05	8.40	8.75	9.10	9.45	9.80	10.15	10.50
80.0	8.40	8.80	9.20	9.60	10.00	10.40	10.80	11.20	11.60	12.00
90.0	9.45	9.90	10.35	10.80	11.25	11.70	12.15	12.60	13.05	13.50
100.0	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50	15.00

No.	$.155	$.16	$.165	$.17	$.175	$.18	$.185	$.19	$.195	$.20
.5	.08	.08	.08	.09	.09	.09	.09	.10	.10	.10
1.0	.16	.16	.17	.17	.18	.18	.19	.19	.20	.20
1.5	.23	.24	.25	.26	.26	.27	.28	.29	.29	.30
2.0	.31	.32	.33	.34	.35	.36	.37	.38	.39	.40
2.5	.39	.40	.41	.43	.44	.45	.46	.48	.49	.50
3.0	.47	.48	.50	.51	.53	.54	.56	.57	.59	.60
3.5	.54	.56	.58	.60	.61	.63	.65	.67	.68	.70
4.0	.62	.64	.66	.68	.70	.72	.74	.76	.78	.80
4.5	.70	.72	.74	.77	.79	.81	.83	.86	.88	.90
5.0	.78	.80	.83	.85	.88	.90	.93	.95	.98	1.00
5.5	.85	.88	.91	.94	.96	.99	1.02	1.05	1.07	1.10
6.0	.93	.96	.99	1.02	1.05	1.08	1.11	1.14	1.17	1.20
6.5	1.01	1.04	1.07	1.11	1.14	1.17	1.20	1.24	1.27	1.30
7.0	1.09	1.12	1.16	1.19	1.23	1.26	1.30	1.33	1.37	1.40
7.5	1.16	1.20	1.24	1.28	1.31	1.35	1.39	1.43	1.46	1.50
8.0	1.24	1.28	1.32	1.36	1.40	1.44	1.48	1.52	1.56	1.60
8.5	1.32	1.36	1.40	1.45	1.49	1.53	1.57	1.62	1.66	1.70
9.0	1.40	1.44	1.49	1.53	1.58	1.62	1.67	1.71	1.76	1.80
9.5	1.47	1.52	1.57	1.62	1.66	1.71	1.76	1.81	1.85	1.90
10.0	1.55	1.60	1.65	1.70	1.75	1.80	1.85	1.90	1.95	2.00
20.0	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	4.00
30.0	4.65	4.80	4.95	5.10	5.25	5.40	5.55	5.70	5.85	6.00
40.0	6.20	6.40	6.60	6.80	7.00	7.20	7.40	7.60	7.80	8.00
50.0	7.75	8.00	8.25	8.50	8.75	9.00	9.25	9.50	9.75	10.00
60.0	9.30	9.60	9.90	10.20	10.50	10.80	11.10	11.40	11.70	12.00
70.0	10.85	11.20	11.55	11.90	12.25	12.60	12.95	13.30	13.65	14.00
80.0	12.40	12.80	13.20	13.60	14.00	14.40	14.80	15.20	15.60	16.00
90.0	13.90	14.40	14.85	15.30	15.75	16.20	16.65	17.10	17.55	18.00
100.0	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00

No.	$.205	$.21	$.215	$.22	$.225	$.23	$.235	$.24	$.245	$.25
.5	.10	.11	.11	.11	.11	.12	.12	.12	.12	.13
1.0	.21	.21	.22	.22	.23	.23	.24	.24	.25	.25
1.5	.31	.32	.32	.33	.34	.35	.35	.36	.37	.38
2.0	.41	.42	.43	.44	.45	.46	.47	.48	.49	.50
2.5	.51	.53	.54	.55	.56	.58	.59	.60	.61	.63
3.0	.62	.63	.65	.66	.68	.69	.71	.72	.74	.75
3.5	.72	.74	.75	.77	.79	.81	.82	.84	.86	.88
4.0	.82	.84	.86	.88	.90	.92	.94	.96	.98	1.00
4.5	.92	.95	.97	.99	1.01	1.04	1.06	1.08	1.10	1.13
5.0	1.03	1.05	1.08	1.10	1.13	1.15	1.18	1.20	1.23	1.25
5.5	1.13	1.16	1.18	1.21	1.24	1.27	1.29	1.32	1.35	1.38
6.0	1.23	1.26	1.29	1.32	1.35	1.38	1.41	1.44	1.47	1.50
6.5	1.33	1.37	1.39	1.43	1.46	1.50	1.53	1.56	1.59	1.63
7.0	1.44	1.47	1.51	1.54	1.58	1.61	1.65	1.68	1.72	1.75
7.5	1.54	1.58	1.61	1.65	1.69	1.73	1.76	1.80	1.84	1.88
8.0	1.64	1.68	1.72	1.76	1.80	1.84	1.88	1.92	1.96	2.00
8.5	1.74	1.79	1.83	1.87	1.91	1.96	2.00	2.04	2.08	2.13
9.0	1.85	1.89	1.94	1.98	2.03	2.07	2.12	2.16	2.21	2.25
9.5	1.95	2.00	2.04	2.09	2.13	2.19	2.23	2.28	2.33	2.38
10.0	2.05	2.10	2.15	2.20	2.25	2.30	2.35	2.40	2.45	2.50
20.0	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	5.00
30.0	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	7.50
40.0	8.20	8.40	8.60	8.80	9.00	9.20	9.40	9.60	9.80	10.00
50.0	10.25	10.50	10.75	11.00	11.25	11.50	11.75	12.00	12.25	12.50
60.0	12.30	12.60	12.90	13.20	13.50	13.80	14.10	14.40	14.70	15.00
70.0	14.35	14.70	15.05	15.40	15.75	16.10	16.45	16.80	17.15	17.50
80.0	16.40	16.80	17.20	17.60	18.00	18.40	18.80	19.20	19.60	20.00
90.0	18.45	18.90	19.35	19.80	20.25	20.70	21.15	21.60	22.05	22.50
100.0	20.50	21.00	21.50	22.00	22.50	23.00	23.50	24.00	24.50	25.00

No.	$.255	$.26	$.265	$.27	$.275	$.28	$.285	$.29	$.295	$.30
.5	.13	.13	.13	.14	.14	.14	.14	.15	.15	.15
1.0	.26	.26	.27	.27	.28	.28	.29	.29	.30	.30
1.5	.38	.39	.40	.41	.41	.42	.43	.44	.44	.45
2.0	.51	.52	.53	.54	.55	.56	.57	.58	.59	.60
2.5	.64	.65	.66	.68	.69	.70	.71	.73	.74	.75
3.0	.77	.78	.80	.81	.83	.84	.86	.87	.89	.90
3.5	.89	.91	.93	.95	.96	.98	1.00	1.02	1.03	1.05
4.0	1.02	1.04	1.06	1.08	1.10	1.12	1.14	1.16	1.18	1.20
4.5	1.15	1.17	1.19	1.22	1.24	1.26	1.28	1.31	1.33	1.35
5.0	1.28	1.30	1.33	1.35	1.38	1.40	1.43	1.45	1.48	1.50
5.5	1.40	1.43	1.46	1.49	1.51	1.54	1.57	1.60	1.62	1.65
6.0	1.53	1.56	1.59	1.62	1.65	1.68	1.71	1.74	1.77	1.80
6.5	1.66	1.69	1.72	1.74	1.79	1.82	1.85	1.89	1.92	1.95
7.0	1.79	1.82	1.86	1.89	1.95	1.96	2.00	2.03	2.07	2.10
7.5	1.91	1.95	1.99	2.03	2.06	2.10	2.14	2.18	2.21	2.25
8.0	2.04	2.08	2.12	2.16	2.20	2.24	2.28	2.32	2.36	2.40
8.5	2.17	2.21	2.25	2.30	2.34	2.38	2.42	2.47	2.51	2.55
9.0	2.30	2.34	2.39	2.43	2.48	2.52	2.57	2.61	2.66	2.70
9.5	2.42	2.47	2.52	2.57	2.61	2.66	2.71	2.76	2.80	2.85
10.0	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95	3.00
20.0	5.10	5.20	5.30	5.40	5.50	5.60	5.70	5.80	5.90	6.00
30.0	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	9.00
40.0	10.20	10.40	10.60	10.80	11.00	11.20	11.40	11.60	11.80	12.00
50.0	12.75	13.00	13.25	13.50	13.75	14.00	14.25	14.50	14.75	15.00
60.0	15.30	15.60	15.90	16.20	16.50	16.80	17.10	17.40	17.70	18.00
70.0	17.85	18.20	18.55	18.90	19.25	19.60	19.95	20.30	20.65	21.00
80.0	20.40	20.80	21.20	21.60	22.00	22.40	22.80	23.20	23.60	24.00
90.0	22.95	23.40	23.85	24.30	24.75	25.20	25.65	26.10	26.55	27.00
100.0	25.50	26.00	26.50	27.00	27.50	28.00	28.50	29.00	29.50	30.00

No.	$.40	$.50	$.60	$.70	$.80	$.90	$1.00	$5.00	$10.00	$50.00
.5	.20	.25	.30	.35	.40	.45	.50	2.50	5.00	25.00
1.0	.40	.50	.60	.70	.80	.90	1.00	5.00	10.00	50.00
1.5	.60	.75	.90	1.05	1.20	1.35	1.50	7.50	15.00	75.00
2.0	.80	1.00	1.20	1.40	1.60	1.80	2.00	10.00	20.00	100.00
2.5	1.00	1.25	1.50	1.75	2.00	2.25	2.50	12.50	25.00	125.00
3.0	1.20	1.50	1.80	2.10	2.40	2.70	3.00	15.00	30.00	150.00
3.5	1.40	1.75	2.10	2.45	2.80	3.15	3.50	17.50	35.00	175.00
4.0	1.60	2.00	2.40	2.80	3.20	3.60	4.00	20.00	40.00	200.00
4.5	1.80	2.25	2.70	3.15	3.60	4.05	4.50	22.50	45.00	225.00
5.0	2.00	2.50	3.00	3.50	4.00	4.50	5.00	25.00	50.00	250.00
5.5	2.20	2.75	3.30	3.85	4.40	4.95	5.50	27.50	55.00	275.00
6.0	2.40	3.00	3.60	4.20	4.80	5.40	6.00	30.00	60.00	300.00
6.5	2.60	3.25	3.90	4.55	5.20	5.85	6.50	32.50	65.00	325.00
7.0	2.80	3.50	4.20	4.90	5.60	6.30	7.00	35.00	70.00	350.00
7.5	3.00	3.75	4.50	5.25	6.00	6.75	7.50	37.50	75.00	375.00
8.0	3.20	4.00	4.80	5.60	6.40	7.20	8.00	40.00	80.00	400.00
8.5	3.40	4.25	5.10	5.95	6.80	7.65	8.50	42.50	85.00	425.00
9.0	3.60	4.50	5.40	6.30	7.20	8.10	9.00	45.00	90.00	450.00
9.5	3.80	4.75	5.70	6.65	7.60	8.55	9.50	47.50	95.00	475.00
10.0	4.00	5.00	6.00	7.00	8.00	9.00	10.00	50.00	100.00	500.00
20.0	8.00	10.00	12.00	14.00	16.00	18.00	20.00	100.00	200.00	1000.00
30.0	12.00	15.00	18.00	21.00	24.00	27.00	30.00	150.00	300.00	1500.00
40.0	16.00	20.00	24.00	28.00	32.00	36.00	40.00	200.00	400.00	2000.00
50.0	20.00	25.00	30.00	35.00	40.00	45.00	50.00	250.00	500.00	2500.00
60.0	24.00	30.00	36.00	42.00	48.00	54.00	60.00	300.00	600.00	3000.00
70.0	28.00	35.00	42.00	49.00	56.00	63.00	70.00	350.00	700.00	3500.00
80.0	32.00	40.00	48.00	56.00	64.00	72.00	80.00	400.00	800.00	4000.00
90.0	36.00	45.00	54.00	63.00	72.00	81.00	90.00	450.00	900.00	4500.00
100.0	40.00	50.00	60.00	70.00	80.00	90.00	100.00	500.00	1000.00	5000.00

This book should be returned to the Library on or before the last date stamped below.

A fine is incurred by retaining it beyond the specified time.

Please return promptly.

Cancelled

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